

# Machine and Tool **BLUE BOOK**

A DIGEST OF THE METAL WORKING INDUSTRY

**FEBRUARY 1948**

**THIS MONTH**

Fluid Power

Cams, Their Production and Application

Generating Holes with a Gear Shaper  
Handwheel Design

The Foremanship Forum

What's New in Metalworking

Available Literature

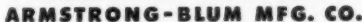
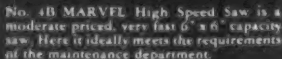
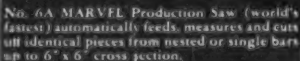
Advertisers' Products Index

Index to Advertisers

**COMPLETE INDEX ON PAGE 5**

**A HITCHCOCK PUBLICATION**

Whatever your metal sawing problem, there is among MARVEL'S 11 different series of sawing machines, a saw or saws that will exactly meet your needs. Your local MARVEL Engineer will gladly study your sawing problems, make recommendations and quote prices.



**5700 Bloomingdale Ave. Chicago 39, U. S. A**

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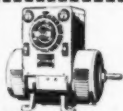


The new **Hobart**  
Industrial Type  
A.C. arc welder brings you  
A.C. welding at its best —

Incorporating all of the advance A. C. welding features that operators have been clamoring for . . . the new Hobart A. C. Welders are unequalled in performance and ease of operation. For production welding and cutting costs they are rapidly being adopted by smart management who know the best in arc welding equipment. They're the choice of operators who are partial to A. C. welding because they cut costs faster, hold a better arc and produce good welds in less time. Fill out and mail the coupon today for complete information on Hobart A. C. Welding advantages!

**HOBART BROTHERS CO., BOX TB-28 TROY, OHIO**

**Hobart** ONE OF THE WORLD'S LARGEST BUILDERS OF ARC WELDERS



Welding Generator Only



Gas Drive Portable Welder



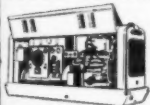
Electric Motor Driven Welders



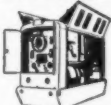
Weldmobile (Self-Propelled)



Transformer



Combination Welder & Power



AC AC Gas Drive Welder, Power

#### HOBART ELECTRODES

Send for new catalog showing complete line. There's a Hobart electrode for every purpose.



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Please send me complete information on the new Hobart Industrial Type A. C. Arc Welders. I'm mainly interested in the:

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OF THE NEW

**RIVETT**

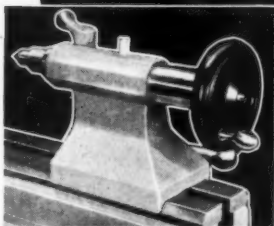
9185 PRECISION CABINET LATHE

## DOUBLE-BEVEL WAYS AND MAXIMUM BEARING AREA!

See the hardened and precision-ground steel bed with double-bevel ways for alignment. In combination with the wide top surface they provide maximum bearing area for slide rest shoe and tailstock. The self-centering action of the double-bevel ways safeguards tailstock from wearing away from cutting tool out of alignment.

Double-bevel ways assure against the inherent weakness of any type of bed which depends upon front bearing only for alignment. In such construction wear is lateral against a narrow bearing area and away from cutting tool which makes for taper turning between centers. This out of alignment also produces off-center (oversize) drilling and reaming.

On double-bevel ways the tailstock may be operated in conventional fashion, slid at will along the bedways and locked in desired position by slight finger touch on the eccentric binder. Binding force is self-centering and downward against a large bearing area.



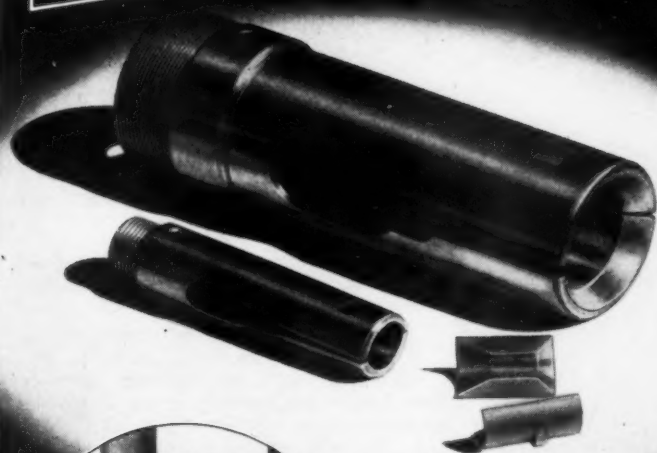
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Correct spindle speed for any operation. Control lever affords any speed from 80 to 3700 r.p.m. Selected speed shows on dial.

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You wouldn't throw away your good SAFETY RAZOR — because of a dull blade. Then why use old-type solid, breakable and costly feed fingers on automatics when... HARDINGE style "B" MASTER FEED FINGERS with replaceable pads will save 30% to 80%.

*For Brown & Sharpe, Cleveland, Cone, Davenport, Greenlee, Gridley, Acme-Gridley, National Acme, New Britain, and New Britain-Gridley Automatic Screw Machines.*

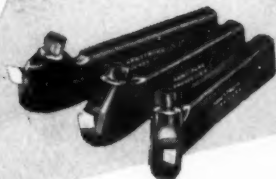
**HARDINGE BROTHERS, INC., ELMIRA, N. Y.**

"PERFORMANCE HAS ESTABLISHED LEADERSHIP FOR HARDINGE"

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# ARMSTRONG TOOL HOLDERS



answer both . . .

1. The problem of lowering costs
2. The problem of increasing output

By providing permanent, multi-purpose, inexpensive ARMSTRONG TOOL HOLDERS that use cutters or bits that are quickly ground from standard high speed shapes, (Saving: All Forging, 70% Grinding and 90% High Speed Steel), the Armstrong System of Tool Holders will reduce your tool cost to an absolute minimum.

By providing stronger, more efficient tools, carefully developed for each operation, as well as ARMSTRONG High Speed Steel, ARMALLOY Cast Alloy Cutter Bits or Armide Carbide-Tipped Cutters as required for each job, ARMSTRONG TOOL HOLDERS permit greatly increased speeds and feeds, enable you to increase the hourly output of every lathe, planer, slotter, shaper, turret lathe and screw machine.

There is no surer way to lower costs and increase output, than to use the correct ARMSTRONG TOOL HOLDER for each operation on all machines.

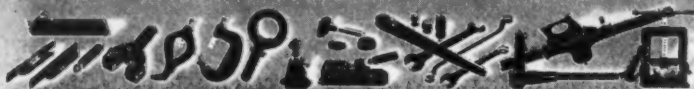
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"The Tool Holder People"

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Published Monthly

Volume 44, No. 2

# Machine and Tool BLUE BOOK

FEBRUARY, 1948

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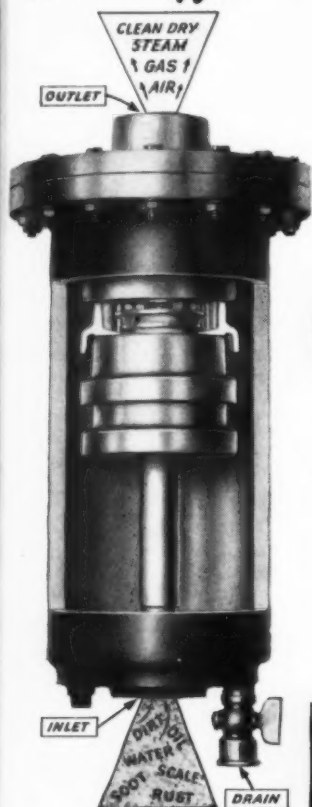
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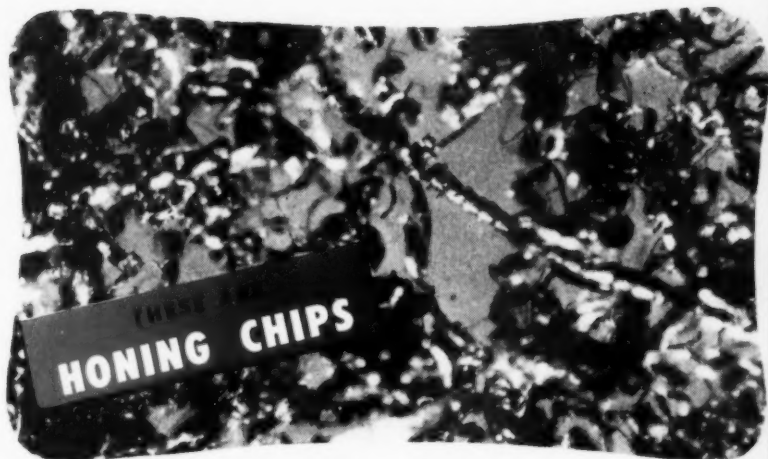


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The accurately rated capacities of CMD Textite Air Separators assure ample C.F.M. volume to clean air and thoroughly dry it. Not mainliners; should be installed at or near point of use. Four sizes from 25 C.F.M. to 250 C.F.M. inclusive. Write for bulletins and complete technical data.

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Dept. 28B, 1928 W. 46th St., Chicago 9, Ill.



**You get FAST STOCK REMOVAL by HONING  
ON FULMER HONING MACHINES!**

The microphotograph above shows actual chip formation produced by honing on a Fulmer Honing Machine—the *fastest, most effective method* of finishing cylindrical bores. With Fulmer Machines, the abrasive stones *cut* the material off, rather than rub it away.

Fulmer Honing Machines handle bores from  $\frac{1}{2}$ " to 30" diam. Stock is removed *fast* with a high degree of accuracy. Tolerance on size, straightness, roundness can be held to  $\pm .0001$ ". Any surface finish ranging from 1 to 20 micro-inches RMS can be automatically produced.

Check these typical  
production examples  
of fast  
stock removal  
by Fulmer  
Honing Machines

PIECE	LENGTH	DIAMETER	STOCK REMOVED	TIME
Hardened Pump Liner	27"	7.250" $\pm .0005$ "	.015"—.018"	1 min.
Forged Gear Blank	Two 6" Bores	4.250" $\pm .0002$ "	.005"	1 min.
Chrome Plated Diesel Liner	32"	8.500" $\pm .0005$ "	.004"—.006" of chrome	3 min.

Get more facts on how Fulmer Honing Machines save production time, cut costs, and improve quality on finishing cylindrical bores. Write for illustrated folder giving machine specifications.

**C. ALLEN FULMER COMPANY**

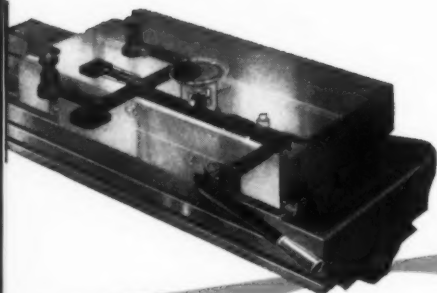
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**FULMER** **PRECISION PRODUCTION EQUIPMENT**

★ Honing Machines • Rod Borers • Piston Ring Lappers

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Phantom drawing of CINCINNATI  
16" x 30" Index Base, showing  
clamping arrangement.

**Makes the machine  
an extra high producer**

**CINCINNATI INDEX BASE**

Right: CINCINNATI No. 4-36 Plain Hy-  
dromatic with CINCINNATI 16" x 30"  
Index Base attachment and tooling by  
Cincinnati Application Engineers to mill  
the slot and both sides of steel yokes.

**THE CINCINNATI MILLING MACHINE CO.**

CINCINNATI 9, OHIO, U. S. A.

MILLING MACHINES • BROACHING MACHINES • CUTTER SHARPENING MACHINES

MACHINE and TOOL BLUE BOOK

February, 1948

● Continuous production of one part or a family of parts for a few days, followed by small quantities for a week or two, all on the same milling machine, calls for *selective* production analysis. The larger the quantities, the more attention they deserve. And that's where CINCINNATI Index Base Attachments may be employed to advantage, for they offer as high as double the production rates obtained in the conventional manner. Here's how it works:

Mount a fixture at each end of the Index Base. While the work in the fixture at one end is being milled, the other fixture is being safely unloaded and loaded. After the return stroke of the table, swivel the Index Base 180° and re-engage the table feed.

The Index Base offers the possibility of almost continuous cutting. It's a *standard* attachment for *standard* CINCINNATI Milling Machines, both knee-and-column and bed type. It's safe; easy to swivel. Catalog M-1448-1, containing engineering data, also tells you how this attachment can be employed to increase production. Write for a copy.



Drive Down  
Tool Costs  
with . . .

## Apex Sockets and Wrenches



Here's how you cut tool costs when you use Apex sockets and wrenches: **FIRST**. They are accurately machined from electric furnace high carbon alloy bars—cold broached and carefully heat treated to give maximum strength and shock resistance.

They are built to stand tremendous strains and shocks. **SECOND**. These sockets and wrenches can be furnished—on request—to definite hardness specifications for best service on specific jobs. **THIRD**. Apex sockets stay on the toughest jobs (self tapping screws, for example) much longer than ordinary sockets.

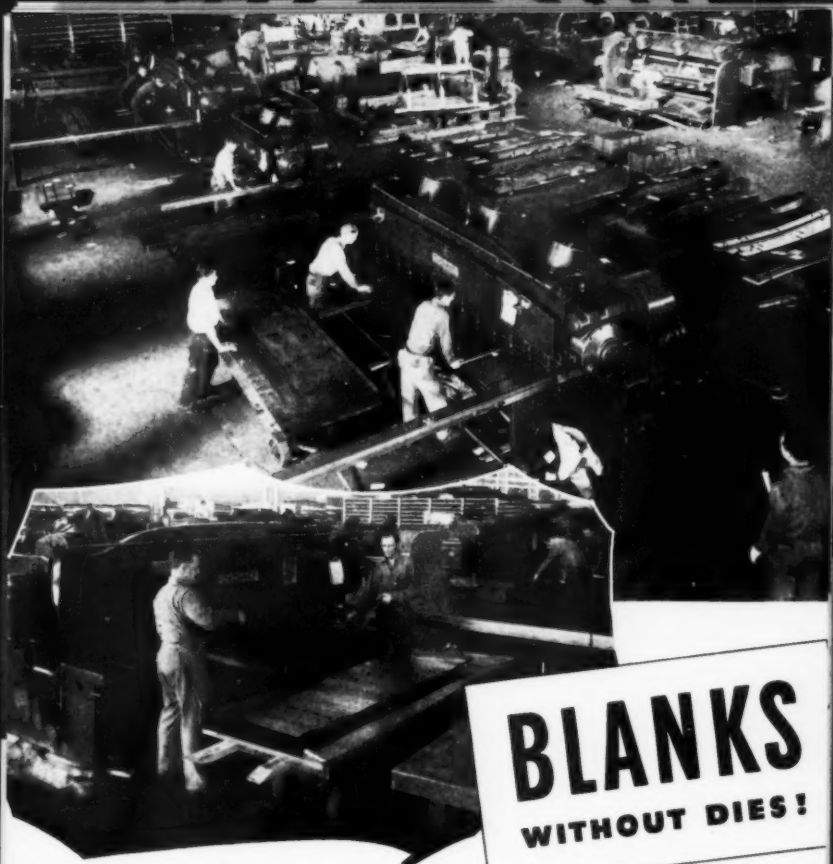
We're tooled up for speed and flexibility. Should you require a special wrench, send us sketch, blueprint or description and we'll quote promptly. Write for Catalog 18.

Female square drives:  $\frac{1}{4}$ "— $\frac{3}{32}$ "  
— $\frac{3}{16}$ "— $\frac{1}{2}$ "— $\frac{5}{8}$ "— $\frac{3}{4}$ " and 1"

# APEX sockets

THE APEX MACHINE & TOOL CO., 1029 S. Patterson Blvd., Dayton 2, Ohio

Safety Friction Tapping Chucks; Quick Change and Positive Drive Drill Chucks; Vertical Float Tapping Chucks; Parallel Floating Tool Holders; Power Bits for Phillips, Slotted Head, Frearson and Clutch Head Screws; Hand Drivers for Phillips and Clutch Head Screws; Aircraft, Industrial Universal Joints; Sockets and Universal Joint Socket Wrenches.



Courtesy—Central Steel and Wire Co.

# BLANKS WITHOUT DIES!



Cincinnati Shears have reduced costs sharply in the production of straight-sided blanks. The exceptional accuracy of Cincinnati Shears—the ability to cut to thousandths of an inch—the ability to cut straight—all mean accurate, true blanks without dies.

The flexibility of Cincinnati Shears—the power to produce endless sizes of straight-sided blanks—the rapid, convenient gauging—all contribute to the cost reduction.

Our representative will be glad to discuss Cincinnati Shears with you.

Write for Catalog S-4 for a description of the Cincinnati Line of All-Steel Shears.

## THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO U.S.A.  
SHAPERS - SHEARS - BRAKES



Tenthousandth Set  
.300" to 14", \$100.00



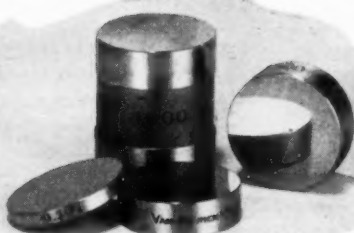
Thousandth Set  
.400" to 5", \$40.00



Micrometer Set  
1" to 21", \$60.00



Toolmakers Set  
1/16" to 2-7/64", \$17.50



## THE NEW VAN KEUREN 7/8" DIAMETER MICROGAGES ARE THE BEST BUY

60% more wearing surface . . . 25% greater accuracy . . . Body true cylinders . . . Ends square with body . . . No increase in price.

### A Foundation For Accuracy For 25 Years

Van Keuren Microgages have been popular for over 25 years, because they provide a low cost means of securing accuracy in the shop, to meet the demands of the inspection department.

The original Microgages were made 11/16" in diameter. The 7/8" body diameter of the NEW Microgages are ground true cylinders, and the end surfaces are held square with the body within close limits. This enables them to be easily aligned on machine ways for measuring carriage travel. The new Microgages have 40% more wearing surface than rectangular gages and they wring together tenaciously. The 7/8" diameter body provides excellent rigidity for the 6" long blocks.

Microgages up to 1" length are held within a tolerance of plus 12 millionths minus 8 millionths. They have an average wear allowance of 4 millionths oversize. They are available as individual gages from .0625" to 6" length, or in sets especially designed for general shop use, for tool setting and for tool makers and machinists.

THE *Van Keuren*

29th YEAR

CO., 177 Waltham Street, Watertown, Mass.

Light Wave Equipment • Light Wave Micrometers • Gage Blocks • Tap & Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Triangles • Carbonyl Plug Gages • Carbonyl Measuring Wires

## Production Up 22% on 44-Inch Pinion Gears



### SUNICUT . . .

**Enables Gear Manufacturer to Increase Feed, Speed, and Tool Life; and to Improve I**

Since changing to Sunicut, a manufacturer of steel-mill gears has increased production by 22%, improved finish, and added greatly to the life of his gear cutters.

**Operation:** Cutting 44" herringbone gears.

**Machine:** Dominion herringbone gear generator.

**Materials:** Stainless steel, high carbon steel, bronze, other alloys.

**Cutting Oil:** Sunicut.

**This case is just one of thousands** in which experienced production men have found that Sun "Job Proved" cutting oils help to increase production and to improve quality as well.

**Sunicut is a clear, free-flowing cutting oil**, produced by an exclusive Sun process. It has high lubricating value and has excellent heat-dissipating and anti-weld properties. It makes possible heavy cuts at high speed while accuracy and satin-smooth finish are maintained. For full information call your Sun Cutting Oil Engineer or write Department MT-2.

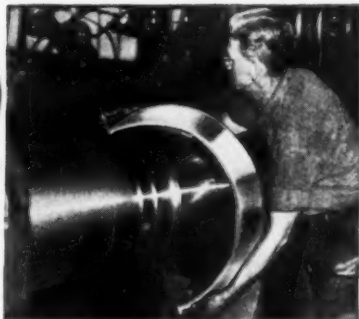
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**SUN**  
**SUNOCO**

**INDUSTRIAL  
PRODUCTS**

# TUMICO Micrometer Offers Laboratory Measuring Accuracy On This Large Ship Journal

**Tubular Frame Provides  
"Feather Touch" feel in Gaging to .001"  
on 18" Ground Diameter—Rigid Micrometer  
Structure Reduces Flexure Inaccuracies.**



Observe how easily the operator grasps this 24" mandrel type micrometer to gage the ground surface of this 18" diameter ship journal.

You can depend upon Tubular micrometers to measure all work diameters with laboratory accuracy. Through scientifically engineered hollow frame structure instrument weight is reduced permitting "Feather Touch" feel on diameters up to and over 96". Rigid micrometer frame design with broad sectional surface through entire bow minimizes flexure inaccuracies.

## MORE TIME SAVING—PROFIT PRODUCING TUMICO PRODUCTS FOR YOUR NEEDS.

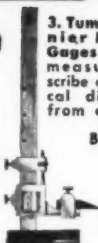


**1. Tumico Caliper and Wire Gage** is a combination measuring instrument. It will measure sheets and plates from 0" to 4". Wire gage slots are U. S. Standard No. 1 through No. 30. Markings are deep etched for rapid reading.



**2. Tumico Tubular Micrometers** feature "feather-touch" feel for making repetitive precision measurements. They are available in the

Series T fixed anvil type in size 0" to 30" and in Series M mandrel type in sizes from 0" to 96" both in sets or combination. Embodied in these micrometers are such important structural features as hardened and ground spindles, ground and lapped spindle threads, special alloy steel vacuum sealed frames, triple plated with copper, nickel and chrome and easy to read numerals.



**3. Tumico Vernier Height Gages** quickly measure and scribe off vertical distances from a plane surface.

Beam and vernier are scientifically calibrated and deep etched for clear, easy reading. This gage is indispensable in the tool shop when precision measurements must be maintained.



**4. Tumico Thrift Micrometers** are economically priced units having drop forge steel frames, hardened anvils and spindle tips. They are available with ratchet stop and lock ring, or Vernier scale in size 0" to 6".

## Write Today

—for further information about Tumico Precision Measuring Instruments for all standard and special requirements.

**TRADE  
TUMICO  
MARK**

**TUBULAR MICROMETER CO.**

ST. JAMES, MINNESOTA, U.S.A. MILWAUKEE BRANCH PLANKINTON BLDG.





## IT TAKES SOMETHING EXTRA TO BE A *Specialist!*

Navigation demands specialized knowledge, mathematical precision and resolute responsibility... not so much different from the characteristics required to produce BATH taps!

Toughened by hardening and tempering—then ground from the solid, BATH ground thread taps are "controlled taps"! All grinding is done on center holes (ground after the blank is hardened), thus holding all dimensions concentric with the tap axis. This means closer tolerances in all stock and special size BATH taps.

The name BATH on any tap represents our responsibility to consistently uphold a tradition for quality. See your BATH representative or write direct about your tap problems.

(Transportation is paid to your plant on all Bath products)

# JOHN BATH CO.

INCORPORATED

14 Grafton Street  
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GROUND THREAD TAPS • PLUG AND RING THREAD GAUGES • INTERNAL MICROMETERS

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# SUNNEN HONING Saves Production Time.. Produces Straight Round Holes, At Low Cost ...Duplicates Sizes Quickly and Easily

With the Sunnen Precision Honing Machine you can size and finish internal diameters from .120" to 2.625" quickly and accurately.

Accuracy is guaranteed to be within .0001", produces any degree of surface finish desired.

Sunnen Honing provides real savings in long run production costs—and even greater savings on job lots and short runs when frequent size changes are necessary.

Find out how you can save time and money—and increase production of accurate internal diameters. Write for complete information—or call in a Sunnen engineer.



## Typical Examples



Two lands, 7/8" long, honed in perfect alignment.



Bronze Valve. The Sunnen method of honing is used to secure a high finish and accuracy.



Smooth surfaces provide long life for washing machine parts.



Bell-mouth eliminated, production increased on these line reamer bushings.



Drawing and Blanking Die. "Saves time in producing smooth base metal finish."

## SUNNEN PRODUCTS COMPANY

7935 Manchester Avenue

Canadian Factory: Chatham, Ontario

St. Louis 17, Missouri

MACHINE and TOOL BLUE BOOK

February, 1948

*want...*  
**longer bearing life?**



## **SUPERFINISH** *... assures it!*

● Yes, you can double—triple—quadruple—the life of bearings with simple, precautionary measures which take only a few minutes.

Examine a finely ground surface. No matter how smooth it may appear, it has defects in the form of grinder scratches, chatter and feed marks, and "smear metal" softened by the heat of grinding wheels. When these tiny metal ridges rub together, they rupture the protective oil film to cause scoring, excessive wear and increased clearances.

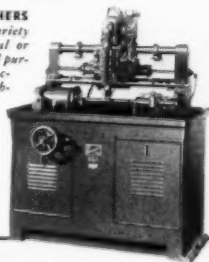
Superfinishing removes these defects—produces a bearing surface that is virtually

frictionless. And its life is almost unlimited.

Superfinishing is a much quicker and more economical process than you may think. And it pays for itself many times over in better service and lower replacement cost.

Ask your nearest Gisholt Representative for the facts about Superfinishing.

**GISHOLT SUPERFINISHERS** are available in a variety of types for cylindrical or flat surfaces; for general purpose or continuous production work; also as attachments for use on lathes. Write for literature.



**GISHOLT MACHINE COMPANY** • Madison 3, Wisconsin  
TURRET LATHES • AUTOMATIC LATHES • BALANCERS  
SUPERFINISHERS • SPECIAL MACHINES

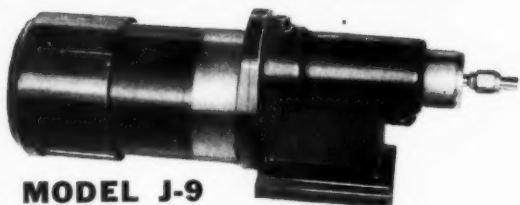


### **THE GISHOLT ROUND TABLE**

represents the collective experience of specialists in the machining, surface finishing and balancing of round or partly round parts. Your problems are welcomed here.

**NEW!**

## GOVRO-NELSON UNIT



**MODEL J-9**

1. Spindle speed—9000 RPM.
2. Equipped with 3-phase, 60-cycle induction motor.
3. Three-point, ball-bearing suspension for smooth operation.
4. Mechanism runs in oil bath.
5. Built-in rate of feed control for reaming purposes.
6. Dwell at end of stroke.
7. Completely automatic with remote electrical controls.
8. Integral foot for accurate alignment.
9. Machined diameter at nose for special adaptations.
10. Can be operated continuously at 35 operations per minute.

WRITE FOR  
*Literature*

### GOVRO-NELSON CO.

*Machinists of Precision Parts  
for 25 Years*

**1933 Antoinette  
Detroit 8, Mich.**

*Automatic* **DRILLING UNIT**

# "American" GREEN CARBOLITE (G-C)



**A**merican Green Carbolite Grinding Wheels help step up production . . . keep super-hard carbide tools at top cutting efficiency. "American" Carbolite Wheels are available in straight, cylinder, cup, dish and plate-mounted shapes—No. 8 structure for precision grinding, No. 15 for cool, heavy cuts and rapid stock removal on the hardest carbides. Write for information.

## AMERICAN EMERY WHEEL WORKS

7 RICHMOND SQUARE, PROVIDENCE 1, RHODE ISLAND

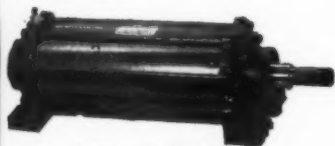
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# PNEUMATICS INCORPORATED

of Plymouth, Indiana, U.S.A.

These air cylinders are made to your order with any length stroke you request in any of these bore sizes: 1½, 2, 2½, 3, 4, 5, 6, 8, 10

In ordering please write mounting, bore, stroke and piston rod thread you want.

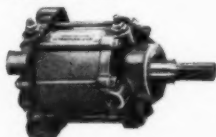


Series "E" Model 1500  
Foot Mount

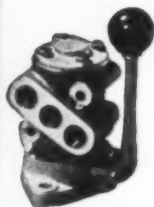


Series "E" Model 1200 Front  
Flange Mount

Series "E"  
Model 1300  
Rear Flange  
Mount

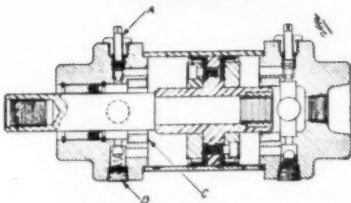


Series "E" Model 1100  
Trunnion Mount



Model 5213 Hand  
Lever Operated Four  
Way Air Valve

These valves are made to operate double acting air cylinders. They have ½" pipe thread inlet and outlet air ports. They have full size air passages without restrictions that permit the fastest action.



Metering Needle  
"A" Ball Check  
"B" and Bushing  
"C" May be  
added if cushion is  
requested



Plymouth Model 5422  
Pilot Operated 4 Way  
Valve



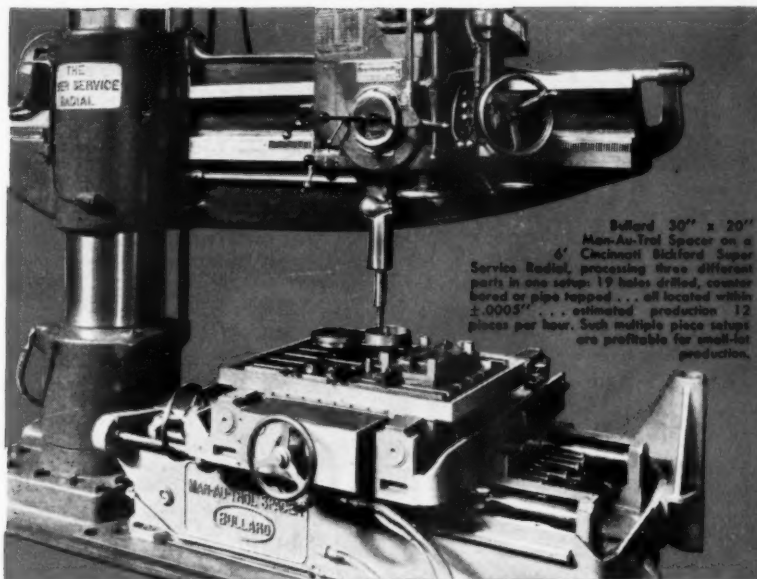
Model 5323 Foot  
Operated Four Way  
Air Valve



Model 5522  
Plymouth Single  
Solenoid Operated  
4-Way Air Control  
Valves

Write for  
complete  
list and  
information

**PNEUMATICS INCORPORATED**  
OF PLYMOUTH INDIANA



Bullard 30" x 20"  
Man-Au-Trol Spacer on a  
6' Cincinnati Richmond Super  
Service Radial, processing three different  
parts in one setup: 19 holes drilled, counter  
bored or pipe tapped . . . all located within  
±.0005" . . . estimated production 12  
pieces per hour. Such multiple piece setups  
are profitable for small lot  
production.

## NEW BULLARD MAN-AU-TROL SPACER

### *Eliminates Hole-Locating Jigs and Fixtures*

The BULLARD MAN-AU-TROL SPACER now on the production line is more than living up to its advance notices. Machines and men formerly tied up on the non-productive work of making hole-locating jigs are now doing the kind of productive work that cuts operating overhead, develops competitive price advantages and steps up profit. Drilling, boring, reaming and tapping volume and accuracy are reaching new peaks . . . while operators' fatigue is measurably reduced.

To bring yourself up to date on this revolu-

tionary new hole-locating method, write for complete information. The Bullard Company, Bridgeport 2, Connecticut.

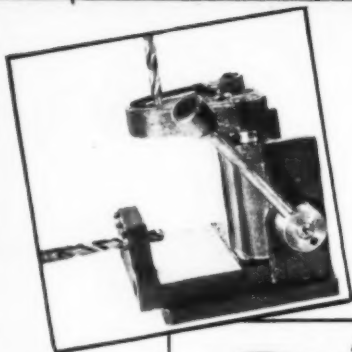
**BULLARD**

CREATES NEW METHODS  
TO MAKE MACHINES DO MORE

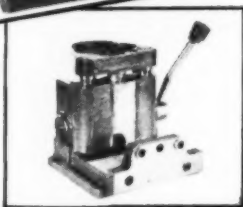


**LIFT-SWING**  
PATENTED

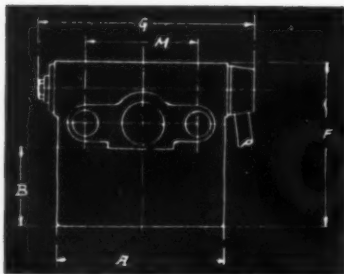
# Fixtures for DRILLING TAPPING - COUNTERBORING INSPECTION - at one setting



Lift-Swing in closed position



Lift-Swing open — note absence of projection over work.



A—Range from 4 1/4" to 8"    F—Range from 4 3/4" to 7 3/4"  
B—Range from 2 1/4" to 4"    G—Range from 6" to 10 3/4"  
M—Range from 2 3/4" to 5 3/4"

If you want economy, the **LIFT-SWING** combination Drill Jig and Work Holding Fixture will satisfy your most exacting demands, for these very good reasons:

1. **DIE SET ACCURACY**—hardened and ground bushings—stationary guide and pilot pins maintain exact alignment at all times.
2. **TOP SWINGS ASIDE**—for loading and unloading—for performing other operations—for inspection of the work—without disturbing setting.
3. **TOP PLATES INTERCHANGEABLE** — a single base can be used for a number of different jobs by using a top plate for each.
4. **TWO POSITION OPERATION**—bearing faces permit drilling in two planes at right angles to each other.
5. **SIMPLE CAM LOCK** release and handle permit **FAST OPERATION**.
6. **COST** is much less than custom made jigs.
7. **11 standard sizes.**

Send for 8 Page Bulletin

**Acme  
Tool Manufacturing Co.**  
57 Perry St., Belleville, 9, N. J.

**SEND FOR NAME OF NEAREST SUPPLY HOUSE**

# PROVEN PERFORMANCE

SELLS 6 OUT OF 10 GRAND RAPIDS GRIND

Of every ten Grand Rapids Hydraulic Feed Surface Grinders sold, six are to customers already using Gallmeyer and Livingston grinding machinery.

Such customer acceptance and approval is proof of the quality of Grand Rapids Grinders.



## FEATURES

- 125 feet per minute longitudinal table speed
- Separate motors to drive grinding wheel spindle and hydraulic mechanism
- Two spindle speeds to reduce work costs
- Portable, self-contained motor driven coolant system
- Vickers vane type hydraulic pump
- Starters, controls and motors easily accessible
- Special G & L spindle motor end bells and over-size precision ball bearings

## SPECIFICATIONS

Automatic table travel—longitudinal 38", transverse  $13\frac{1}{2}"$   
Working surface of table— $12" \times 36"$  • Standard wheel size— $12" \times 1" \times 3"$  • Vertical movement of wheel head—18" • Spindle speeds—1925 and 2500 RPM • Floor space—150" wide x 102" deep

Write for Bulletin GL 101



- Patented vertical adjustment of wheel head. The large hand wheel is graduated in thousandths, the small one in tenths of thousandths.



- Heavy, rugged, one-piece column and base of very close-grained gray iron, cast in our own foundry assures permanent alignment between cross travel ways and vertical head ways.

- Bijur one-shot lubricating system insures long life for bearings, freedom from trouble and eliminates time spent in oiling.



# UP

## WENT THE RATE AND QUALITY OF PRODUCTION

Saved on wheel dressing

Saved on tank cleaning

Saved on grinding wheels, diamonds  
and soluble oil

Maintenance savings per year

\$1823.25

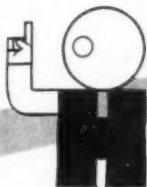
1216.35

600.00

\$3639.60



PRODUCTION OF MACHINE TOOLS INCREASED 3,814 HOURS! This time, evaluated at \$5.00 per hour per machine, is in addition to maintenance saving.



### As HOFFMAN FLOTATION

### EQUIPMENT PROVED:

### "IT PAYS ITS WAY"

### in Savings!

Significant figures from an actual plant test! Hoffman coolant flotation units *aerate out* solid impurities by a new principle. Thus, no filters to change—no strainers to clean . . . entirely automatic. You save on "down" time—you improve quality control and lengthen tool life. **AND**, machines operate continuously for more profitable production. Write for *all* the facts!



# U. S. HOFFMAN

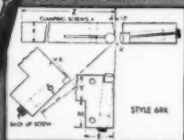
MACHINERY  
CORPORATION  
215 Lamson St., Syracuse, N. Y.

COOLANT FILTERS • FILTRATION ENGINEERING SERVICE

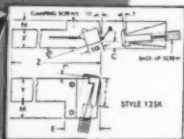
Another **KENNAMETAL** Development

# KENNAMATIC Tools

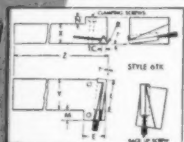
having **CLAMPED-IN, INDEXABLE**  
*Solid KENNAMETAL Inserts*



Style 68K (and opposite hand 69K) have cylindrical inserts that can be indexed several times, then turned end for end and used for a second cycle of cutting before regrinding. When both ends become dull, they are reground, and are then ready for another double cycle of cutting. The inserts can be reground many times.



Style 125K (and opposite hand 115K) have square inserts, indexable four times on each end. Ends can be reground many times and each double-end grind provides eight resharpened cutting edges.



Style 67K (and opposite hand 37K) have triangular inserts, indexable three times on each end. Ends can be reground many times—and each double-end grind provides six resharpened cutting edges.

## ● Solid, Mechanically-Held Kennametal Inserts

Inserts are mechanically-held, *vertically*—best use is made of high compressive strength of Kennametal (up to 800,000 PSI); brazing strains are eliminated.

## ● Indexable Cutting Edges

Can be indexed 6 to 12 times before regrinding. Indexing is a simple operation, and does not require changing tool holder.

## ● Replaceable Inserts

Few standard sizes can be used in a variety of tools and jobs—simplifies tool control; reduces toolroom stocks.

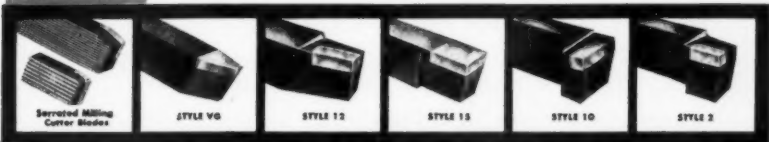
## ● Simplified Regrinding

Resharpener merely requires squaring off both ends of insert, and grinding chip breaker if required—reduces load and confusion in grinding room.

## ● Permanent Setting

Insert can be indexed or changed without changing tool holder setting—less set-up and machine down time.

The overall result of Kennamatic tooling is that higher production rates can be reached, and maintained, at much less cost. Let our engineers suggest suitable applications.

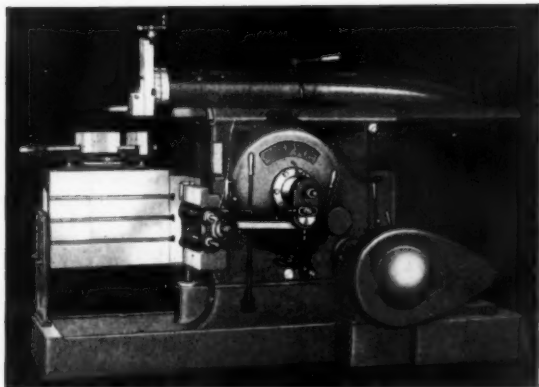


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# Investigate

## THESE HIGH PRODUCTION MACHINES

STEPTOE SHAPERS—Vee type ram—Centralized control. Seven heavy duty sizes, fully equipped with Timken bearings—Four or eight speeds—Twin Disc Clutch—America's oldest and best shaper—Write for catalog B4620.

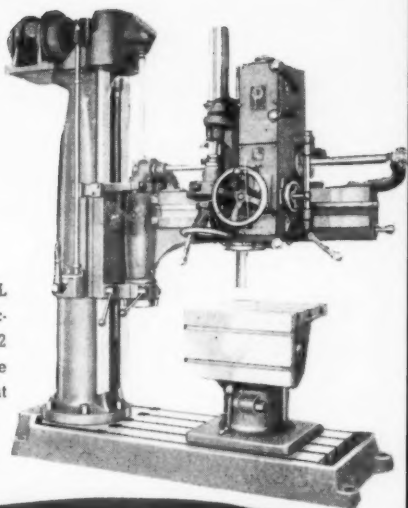


GARVIN AUTOMATIC TAPPERS — "Operator's responsibility ends at the starting lever"—Full range of sizes and multiple heads, 3/16" to 3" diam. taps—Timken bearing equipped—Adjustable torque — Precision depth and reverse control — Less tap breakage — Production estimates on request. Write for catalog B4612.

**WESTERN . . . . .  
MACHINE TOOL WORKS  
HOLLAND MICHIGAN**



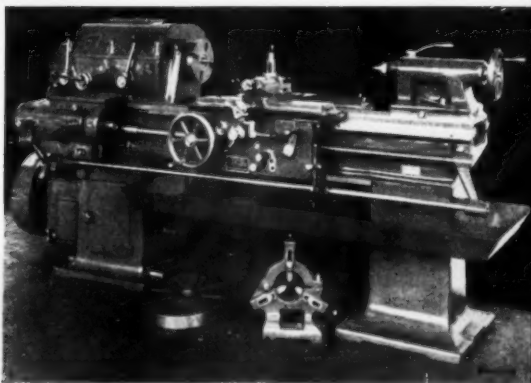
**WESTERN HIGH SPEED RADIAL DRILLS**—for economical high production — Low-Hung spindle drive — 12 speeds in head, 40-2000 R.P.M.—made in six sizes — Ball bearing throughout — Write for catalog B4431.



**CHARD LATHES**—Timken bearing equipment—Multi speed or cone head. Incorporate latest developments in design and accuracy. Built in five sizes:—16"-18"-20"-24" & 28" swing. Write for catalog B4240

CABLE ADDRESS

"WESTERN" HOLLAND



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# AN AMAZING NEW INVENTION!

## THE SHEARCUTTER **ROTARY BROACH**

*PRODUCES*

## PERFECT HOLES



*For use with Lathes, Turret Lathes, Automatic  
Screw Machines, Drill Presses, Boring Machines, Etc.*

### READ THESE ASTOUNDING FACTS!

1. Uses a revolutionary new cutting technique and introduces a new machining method.
2. May be used to replace reamers and broaches.
3. Eliminates costly second operations often necessary to produce finished holes.
4. May be resharpened 10 to 30 times and lasts 5 to 10 times longer than conventional tools before resharpening is necessary.
5. Is equally efficient on ferrous, non-ferrous metals and other materials.
6. Tends to sharpen itself automatically as the chips slide back over the cutting edge—chips resemble steel wool.
7. Produces mirror-like finishes through Shearcutting action and true molecular cleavage.
8. Greatly increases production speeds and reduces costs.

### YOU CANNOT AFFORD NOT TO USE SHEARCUTTER ROTARY BROACHES!

Use this new machining method—Rotary Broaching  
"Rotary Broach" and "Rotary Broaching" are new names coined and  
copyrighted by Shearcut Tool Company.

Patented in Canada. U. S. and Foreign Patents Pending.



## **SHEARCUT TOOL COMPANY**

BOX 746

DEPT. MT-28  
**DISTRIBUTORS WANTED**

RESEDA, CALIFORNIA



# Fast as a Blue Streak

**MAGIC TYPE**

## QUICK-CHANGE CHUCKS

1-2-3  
it's changed!

1 RAISE LOCKING RING

2 TAKE OUT TOOL

3 INSERT OTHER TOOL

—without stopping Machine!

A good stock of Quick-Change Chucks is maintained from which requirements for most sizes can be filled immediately. See pages 98-102 of Scully-Jones Catalog No. 500.

Save set-up time with this "Magic" Quick-Change Chuck. Presto-Change-O, you change tools in your Drill Presses, Vertical Tapping and Boring Machines...insert Drills, Reamers, Boring Bars, Counterbores, Core Drills, Taps or Special Tools, without stopping spindles!

When you raise locking ring, collet drops out automatically for a quick, safe tool change. Four styles of collets available—"AA", "A", "D" and "E" to accommodate various tools. Adds many stations to your machines.

Consult our engineers on adopting "Magic" Quick-Change Chucks and Collets to your production problems. Send us your sketches or blue prints for recommendations and quotations.

Refer to the Scully-Jones Catalog showing over 100 types and sizes of cutting tools, collet-chucks, boring equipment, reamers, etc.

# Scully-Jones

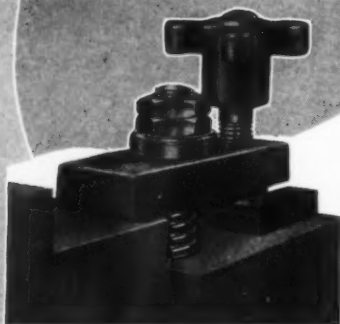
AND COMPANY

1907 SOUTH ROCKWELL STREET • CHICAGO 8, U.S.A.

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# SIEWEK

FIXTURE CLAMPS  
AND FITTINGS



**JACK LOCKS, FIXTURE LOCKS,  
CAMS, KNOBS, REST BUTTONS**

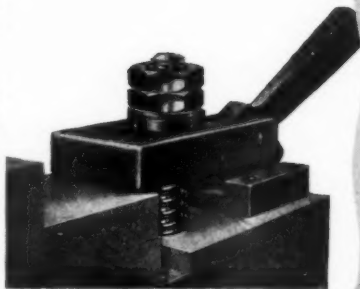
Clamp assemblies and other parts necessary for the construction of special fixtures make up this standard Siewek line.

These Clamp assemblies themselves are made in 36 different types, most of them in three sizes. In other words, there is a type and size to meet the requirements of practically all shops.

*Write for full size template drawings for use in layout work.*

**ALSO MANUFACTURERS OF SIEWEK  
RAPID CLAMPING JIGS AND DETAILS**

**IMMEDIATE DELIVERY**  
from stock of all Siewek Jigs, Clamps and Fittings is now possible from these strategically located firms:  
Paul B. Slater Co., 1025 Santa Fe Ave.,  
Los Angeles, Calif.  
H. Colby Rowell Co., 2447 Nicolet Ave.,  
Minneapolis 4, Minn.  
Fink Tool Co., 898 Clinton Ave., S.,  
Rochester 7, New York  
H. E. Scholey, 2603 N. Main St.,  
Dayton, Ohio



*Siewek* **TOOL COMPANY**

2862 E. GRAND BOULEVARD  
BRANCH OFFICE: CHICAGO — SIEWEK TOOL CO.  
224 S. MICHIGAN AVE. WABASH 5509 CHICAGO 4, ILL.

# Drills last longer and drill better when sharpened on OLIVER 510 DRILL POINTER

Methods studies, taken on drilling operations, have proven that drills sharpened by machine will outlast and out perform drills sharpened by hand.

The OLIVER DRILL POINTER produces the only theoretically correct point for mass production drilling—All points are the same on all drills. Correct clearance and hollow ground centers assure that all drills are drilling equally at the same time.

Without cost to you—send us a few drills to sharpen—Test them on your job—you'll see a marked improvement in your equipment and tools.

(Write for 510 Catalog)



IMPROVE YOUR TOOLROOM  
IT'S THE BACKBONE  
OF PRODUCTION

**OLIVER**  
OF ADRIAN

**OLIVER INSTRUMENT CO.**  
1408 E. Maumee St., Adrian, Michigan

AUTOMATIC DRILL GRINDERS  
TOOL & CUTTER GRINDERS—DRILL  
POINT THINNERS—TEMPLATE  
TOOL GRINDERS—FACE MILL  
GRINDERS—DIEMAKING MACHINES

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK



## *Air Power!*

*Air Power* may be wasted or utilized—as air minded men of today realize. One of the most important applications of air power is the portable air tool.

There are many jobs that only *Air Tools* may do but there are many more jobs that I-R Air Tools can do better than any other type of portable tool.

Harnessing air power in industry has been the job of *Ingersoll-Rand* engineers for more than seventy-five years. This constant experimenting and testing have brought out innumerable advantages in *Air Tools*—light weight and easy handling to reduce operator fatigue and increase efficiency—durability to reduce operation and maintenance costs—versatility to increase production—safety to increase job efficiency and output.

Act now. We can deliver most I-R Air Tools to you from branch stock.



**AIR TOOLS**  
**COMPRESSORS • TURBO BLOWERS**  
**CENTRIFUGAL PUMPS • CONDENSERS**  
**OIL AND GAS ENGINES**

**ROCK DRILLS**

# Ingersoll-Rand

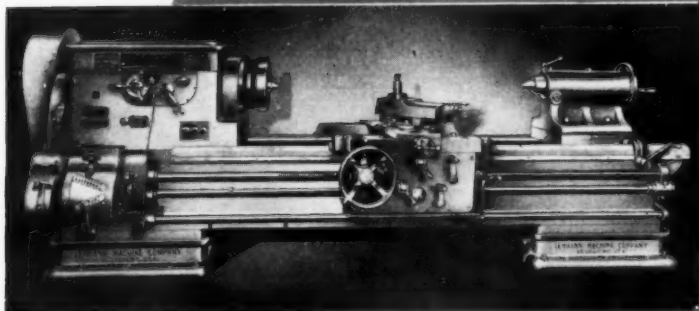
11 Broadway, New York 4, N. Y.

A1-8



# "Lehmann is the Leader in Progressive Engine Lathe Design!"

... say hundreds of machine  
shop superintendents.



## Here's the Standard **HYDRATROL**

HEAVY DUTY 22"-25"; EXTRA HEAVY DUTY 32"-36"

In hundreds of plants, under all sorts of conditions, **HYDRATROL** Heavy Duty Lathes are setting new records for speed, accuracy, dependability, economy. They operate with almost unbelievable smoothness, and do extremely close tolerance work. You'll do it better on a **HYDRATROL**!

### CHECK THESE 8 IMPORTANT FEATURES:

- \* Hydratrol Headstock, the outstanding achievement in lathe design.
- \* Ample Capacity for the Heaviest Work.
- \* Hydraulically-Operated Automatic Speed Changes.
- \* Automatic Slide Rule Indicates Spindle and Cutting Speeds.
- \* Hydraulic Friction Clutches and Brakes Require No Adjustment.
- \* Start, Stop and Reverse Controlled from Headstock and Apron.
- \* 16 Forward and Reverse Spindle Speeds.
- \* Extreme Simplicity and Safety of Operation—

**WE ALSO MAKE THE FAMOUS HOLLOW SPINDLE HYDRATROL — 18" TO 36"**

Send Us Prints of Your Difficult or Too-Costly Machining  
Jobs for a Specific, Time-and-Money-Saving Recommendation

## **LEHMANN Machine Company**

CHOUTEAU AT GRAND • SAINT LOUIS 3, MISSOURI

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# ROTO-CLONE<sup>®</sup> removes the double danger of fibrous, greasy dust

**D**UST presented a double danger in the polishing department of Mouldings, Inc., Indianapolis, Ind., producers of stainless steel moulding for the automotive field. Buffing metal moulding strip produces a fibrous, greasy dust which is both a fire and health hazard. Here, as in scores of plants, Type N Roto-Clones solve the problem by wet collection of the material.

The Type N Roto-Clone\* Hydro-Static Precipitator combines centrifugal forces and intimate intermixing of water and dust-laden air for extremely high cleaning efficiency. It is compact in design, has no moving parts to foul, requires little maintenance and the once dangerous dust is easily removed in harmless sludge form.

The Type N Roto-Clone is available for servicing individual stands, as illustrated, or for use with central system exhausting a group of dust sources. For complete information write for copy of Bulletin No. 277 or contact your local AAF representative.

## AMERICAN AIR FILTER CO., INC.

312 Central Avenue, Louisville 8, Ky.

*In Canada: Darling Bros., Ltd., Montreal, P.Q.*

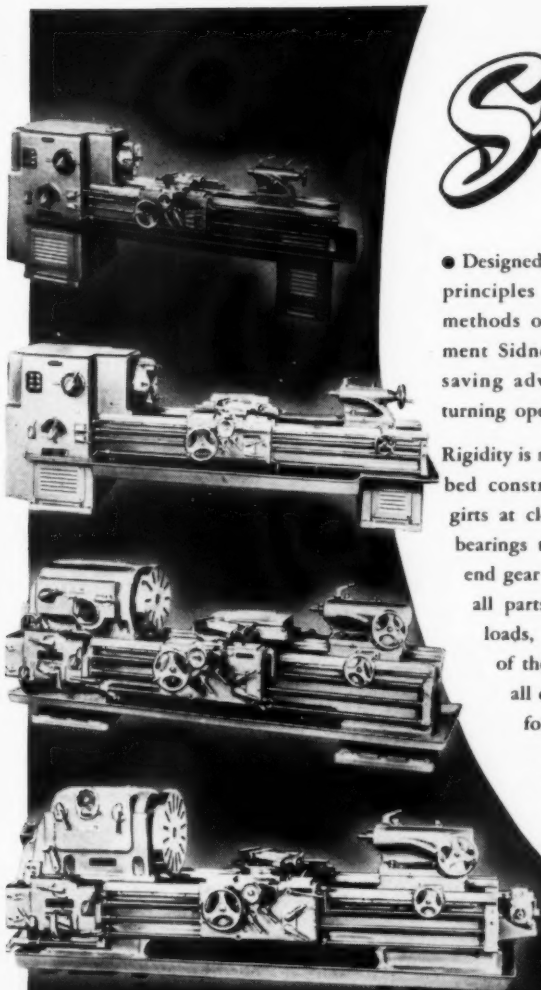
\*Roto-Clone is the trade-mark (Reg. U. S. Pat. Off.) of the American Air Filter Company, Inc., for various dust collectors of the dynamic precipitator and hydro-static precipitator types.



View showing three of 14 Type N Roto-Clones collecting buffing dust in this modern plant.



**ROTO-CLONE<sup>®</sup>**  
**DUST CONTROL EQUIPMENT**



# Sidney LATHES

● Designed around sound engineering principles and produced by modern methods on up-to-the-minute equipment Sidney Lathes offer many cost saving advantages on all types of turning operations.

Rigidity is maintained by the four wall bed construction with double cross girts at close intervals. Anti-friction bearings throughout the headstock, end gear train, gear box, apron and all parts carrying radial or thrust loads, the smooth, silent power of the herringbone geared head all contribute to precision performance over long periods.

Make *your* next lathe a Sidney. Consult a nearby representative for details.

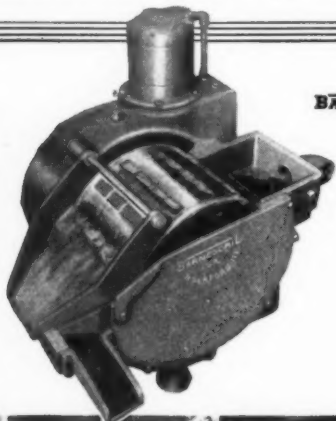


**SIDNEY MACHINE TOOL COMPANY · SIDNEY, OHIO**

*Builders of Precision Machinery Since 1904*

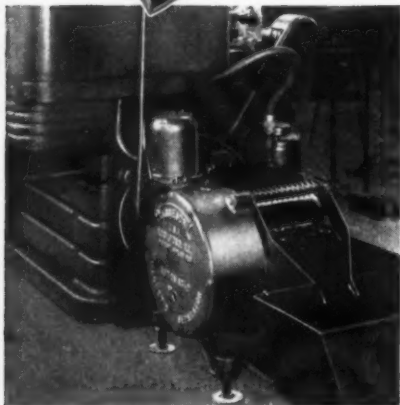
# 44 *More Hours Per Month*

**RESERVED FOR GREATER MACHINE OUTPUT**



## **BARNESDRILL Automatic Coolant Separators**

- Reduce Machine Down-Time
- Prolong Coolant Life
- Keep Coolant Lines Clean
- Improve Work Finish
- Result in Fewer Wheel Dressings



● This prominent manufacturer\* saved 44 man hours, and obtained 22 additional machine hours of productive time per month, by installing a **BARNESDRILL Automatic Coolant Separator** on one of his thread grinding machines. Before using the Separator, it was necessary to shut the machine down 2 hours a day, 11 days a month, to clean out accumulated sludge and sediment. Two men were required to service the operation. Now, with the Separator in use, coolant is cleaned *automatically*, and the machine does not require clean-out.

**BARNESDRILL Automatic Coolant Separators** are the easy, convenient, modern way to maintain high-production metal-cutting equipment. Easy to install, with low initial and operating costs, these Separators help to boost productivity. Write today for descriptive literature.

\*Name on request.

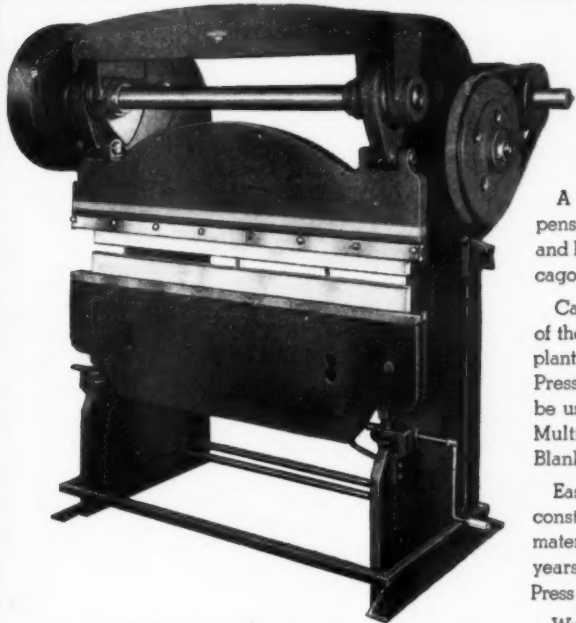
## **BARNES DRILL CO.**

557 CHESTNUT STREET ROCKFORD, ILLINOIS U.S.A.



# Powerful CHICAGO

## STEEL PRESS BRAKE



### TYPE "300"

A POWERFUL, rugged, inexpensive Press Brake, designed and built to the standards of Chicago Steel Forming Presses.

Can handle 40 to 50 percent of the work done in the average plant, thereby releasing the large Presses for heavier work. Can be used for Forming Embossing, Multiple Punching, Notching, Blanking, etc.

Easy of operation, accurate and constructed of highest quality material and backed by over 40 years experience building Steel Press Brakes and Bending Brakes.

World's largest manufacturer of Steel Hand Bending, Power Bending and Power Press Brakes.

A Small Steel Welded Construction Press Brake  
a brute for punishment and a prodigious worker  
for the Sheet Metal Plant—

—3 sizes—capacities 10 gage, 4 ft. long; 12 gage,  
5 ft. long; 14 gage, 6 ft. long. Powered by  
1½ h. p. motor.

A dependable variable speed drive much desired by all users is standard.

**DREIS & KRUMP MANUFACTURING CO.**  
744C LOOMIS BLVD. . . CHICAGO 36, ILLINOIS



*Improves*  
**PRODUCTION**  
**... CUTS COST**



**MODEL**  
**3267-C-172**

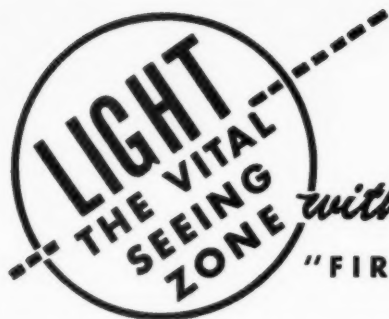
**\$589**

**COMPLETE**

*(Net Industrial Price)*

Used for machine tools, assembly, inspection, and instrument repair work. Overall length 32 3/4". Three joint adjustable. Circular base for 3-screw mounting.

In excess of 200 footcandles.



## *with* LOCALITES

"FIRST FOR SEEING"

The primary function of industrial lighting is to illuminate the worker's task so that he can see quickly, accurately and comfortably all details of his operation. The better his seeing tool — the higher is his efficiency. Only with localized lighting units can the proper quantity of illumination be focused on the immediate work area of each operation according to the seeing requirements of the worker for his particular task. In combination with a proper proportion of general overhead lighting, to avoid too wide a contrast between the illumination of the immediate work area and the surrounding area, the result is Balanced Lighting—planned lighting at its BEST.

- Write for folder on "How to Plan Your Lighting" and complete selection of Localite models.

### THE FOSTORIA PRESSED STEEL CORP.

FOSTORIA, OHIO, U. S. A.

In Canada:

Amalgamated Elec. Corp. and all  
Northern Electric Branches



**MODEL  
32-H-174**



Recommended for small machine tools, lathes, punch presses, etc. Overall length 23 1/4". Two joint adjustable. Flat oblong base for screw mounting.

In excess of 175 footcandles.

**\$4.31 COMPLETE**  
(Net Industrial Price)

**MODEL 3470-P-172**

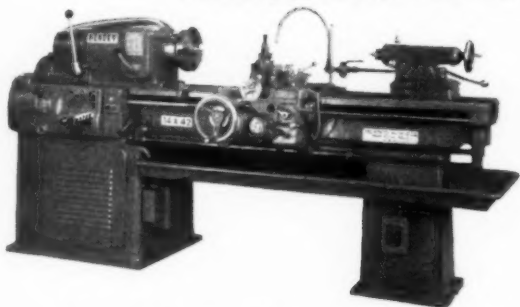


Used for large presses, milling and boring machines. Also assembly and inspection benches. Overall length 45 1/2". Three joint adjustable. Circular base for 3-screw mounting.

In excess of 200 footcandles.

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**AN OUTSTANDING DEVELOPMENT**  
**THE NEW HENDEY No. 2**  
**GENERAL PURPOSE LATHE**



First revealed at the Machine Tool Show, the new Hendey No. 2 General Purpose Lathe is an outstanding development in belt-driven lathes. It offers simpler, safer, faster and more economical operation on all types of light-duty work. Special ingenuity in designing the belt drive and belt shifting mechanism have resulted in two important operational features. First, because the spindle is not directly driven by a belt, but through a gear tooth clutch, belt tension can have no effect on spindle performance. Second, belt shifting has been made 100% safe, simple and fast. The entire belt, pulley and clutch arrangement is fully enclosed. To shift the belt, all the operator need do is pull the belt-shift lever toward himself, move it right or left to engage in the position indicated on the Spindle Index Plate. Four initial spindle speeds are immediately available and, when combined with the back gears, the number is increased to eight, ranging from 30 to 1142 r.p.m.

Other important features of the new Hendey No. 2 include a quick change gear box offering 48 different thread and feed changes, preloaded anti-friction bearing mounted spindle, automatic lubrication throughout, super precision lead screw, bridge truss bed construction and spindle accurately indexed for multiple thread cutting.

The new Hendey No. 2 is truly the last word in belt-driven, general purpose lathes. It will pay you to investigate it thoroughly. Write for complete details today.

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*Main Office and Plant — Torrington, Connecticut*

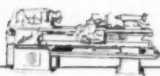
*Offices — N. Y., Chicago, Boston, Detroit, Rochester, Los Angeles, San Francisco*

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**TOOL ROOM LATHES**

12" - 16" - 18" - 20"



**SHAPERS**

12" - 16" - 20"

# Slash production costs

minimize waste

on

die block jobs

with a

**WELLS NO. 12**

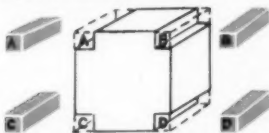
*Here's a  
typical job*

## problem

To remove die block corner sections A, B, C and D, quickly and economically with a minimum loss of material.

## answer

The Wells No. 12. It will do the job with eight fast, accurate cuts with negligible loss of stock... four small blocks are salvaged for making smaller dies.



**WELLS SAW**  
The Best of Band Saws

**Wells**

Now you can handle die block cutting speedily and economically with a metal cutting band saw! The Wells No. 12 has all the features necessary to make it ideal for this type of work... the blade travels parallel to the bed at all times... positive-action limit switch permits cutting to any predetermined depth... electro-hydraulic controls feed blade into work at a constant pressure and return cutting head to any preselected height **AUTOMATICALLY**.

The Wells No. 12 isn't limited to die block work alone. It's a rugged, heavy duty tool suitable for hundreds of cut-off jobs. Ask your Wells Saw dealer for further information or write direct.

## Specifications

<b>ONE BLOCK CAPACITY:</b>	
Maximum Cutting	12 3/4" deep; 16" wide
Maximum Clearance, Bed to Blade	1 1/2"
<b>CUT-OFF CAPACITY:</b>	
Rectangular	12" x 16"
Rounds	12 3/4" O.D.
<b>SPEEDS, Selective:</b>	50, 90, 150 ft. per min.
<b>MOTORS:</b>	1/2 H.P. & 3/4 H.P.
<b>WEIGHT, Approximate</b>	1750 lbs.

*Products by Wells are Practical*

## METAL CUTTING BAND SAWS

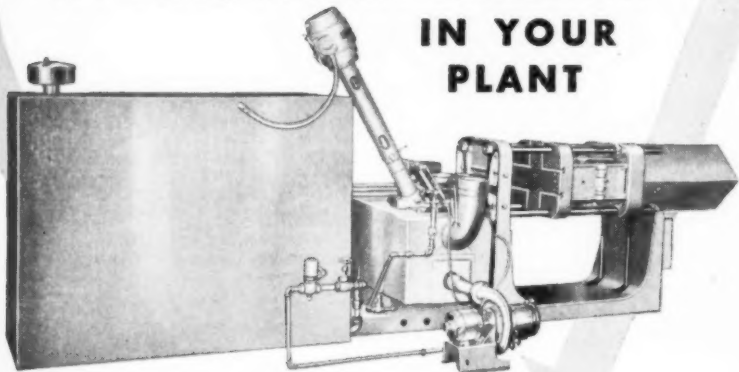
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707 COOLIDGE AVENUE, THREE RIVERS, MICHIGAN

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**CUT COSTS, INCREASE PRODUCTION  
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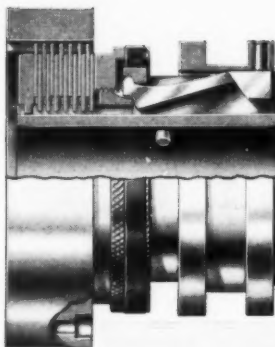


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Hundreds of Harvill machines are in use today . . . saving money and speeding production. There is a size and type for every use . . . to cast zinc, tin, lead, aluminum, magnesium and brass alloys. Write on company letterhead for full facts!

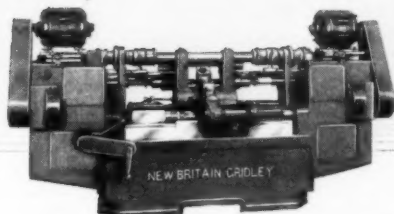


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Normally two single clutches are used in this

model... one to control feed motions, the other for control of the rapid transverse. When threading is done, at either or both ends of the machine, one double clutch serves each spindle.

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For use with end mills  $\frac{1}{8}$ " to 1" in steel. Equipped with verniers, as standard equipment in addition to micrometer dials on table actuating screws for locating. Further accuracy available with rods and indicators which can be furnished as extra equipment.

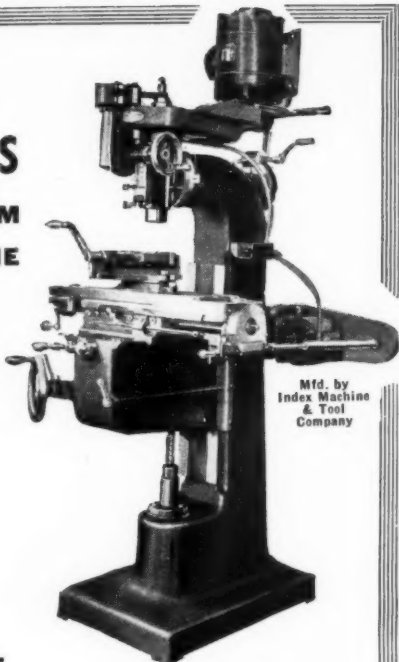
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A quality tool for precision work in the tool room or production line, incorporating such features as ball bearings—hardened and ground worm—quick acting throw-out for free hand turning—single movement table lock that does not cramp table out of alignment—compound trough, 12" size only.

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February, 1948

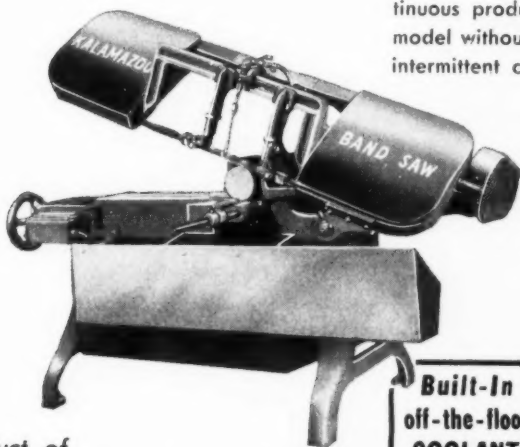


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Cut costs by speeding production — saving labor and reducing investment. A low-cost machine adaptable to 95 per cent of all cut-off work. Continuous cutting action — cuts to close limits — and handles solids, tubes or odd shapes.

**FAST**  
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Production model illustrated, suitable for continuous production. Plain model without coolant for intermittent cutting.



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**Can be —  
changed from  
RIGHT to LEFT  
in 10 seconds**

This versatile tool does the work of 14 tools costing at least four times as much as R and L. You can handle a wide range of multiple operations with the R and L. Typical jobs include pointing work concentric with turned diameter; drilling and chamfering; turning and forming special shape or end of part while drilling or reaming; turning one diameter — chamfering two corners facing end of part along with drilling or reaming; turning two diameters while drilling or reaming. Turning shoulders concentric with stock diameter.

These are just a few of the worthwhile production savings you can realize with R and L tools. Delivery from stock.

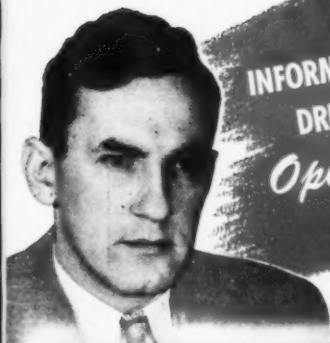
*Let us send booklet describing all the uses of  
R and L Tools.*

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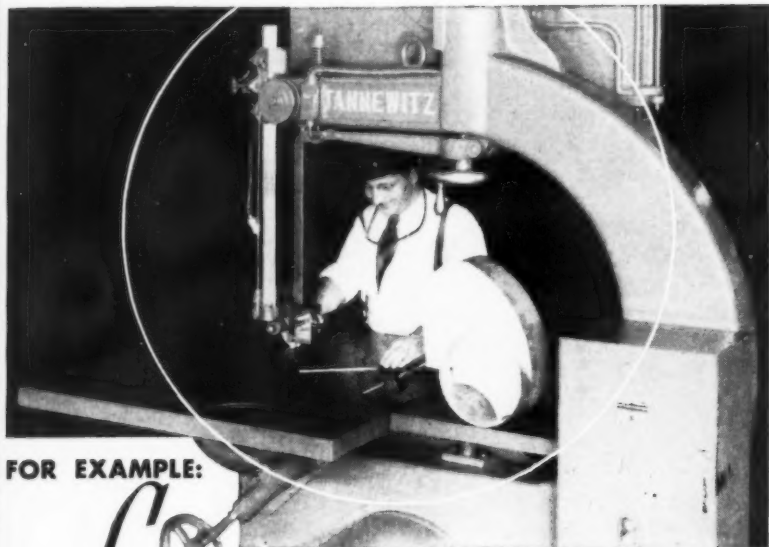
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*solves thousands of Problems!*



FOR EXAMPLE:

**C**UTTING side panels of a barometric damper as shown above. Cost of dies required for seven sizes would have approximated \$12,000 — a prohibitive sum for volume required on these sizes. Friction-sawn on a TANNEWITZ High Speed Band Saw in multiples of two in 1.2 minutes each — a very moderate cost which makes feasible the complete line required. Cost of machine was only a small fraction of cost of dies contemplated and it is also available for many other uses.

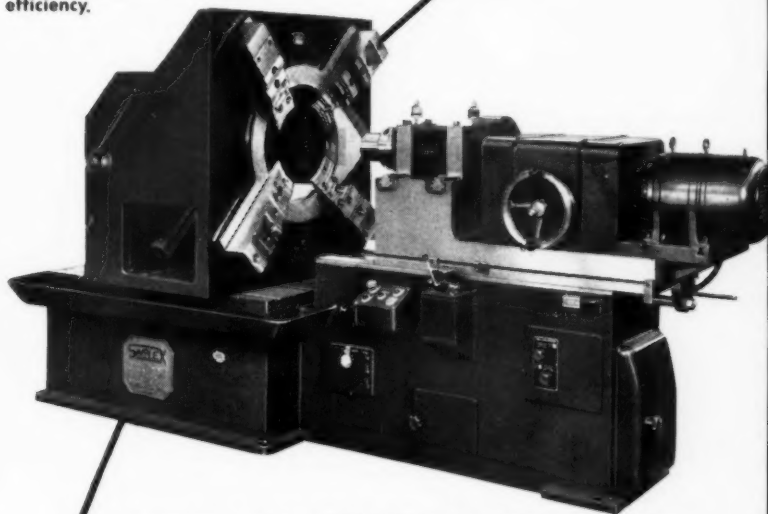
For trimming castings, formed parts, cutting metal as hard as a file and dozens of other operations, too, friction sawing with TANNEWITZ High Speed Band Saws offers tremendous advantage. Write for free booklet, "FRICTION SAWING."

**THE TANNEWITZ WORKS**

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**ELECTRIC MOTOR END SHIELDS** must support rotors rigidly and accurately, yet due to the lightness of the casting, they are usually distorted in machining operations. The precision boring operation on the bearing seat in a multiple step fixture eliminates the inaccuracies and provides for maximum motor efficiency.

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# Barker

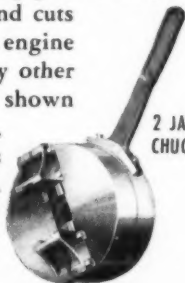
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will pay for itself in 60 to 90 days on production schedules by giving **MORE** parts per hour at a **LOWER** cost per part. Most round parts can be set in the Barker Wrenchless Chuck without stopping the machine. It saves time, helps speed up production, is simple to operate, reduces operator fatigue and cuts spoilage where the run is continuous on turrets, engine lathes, cutting off machines, drill presses or any other type of chucking machine. The Barker Chuck shown above, replacing an ordinary 3-jaw chuck, jumped production from 18 to 24 pieces per hour. It can do it in *your* plant too. Let us show you how!

3 JAW  
CHUCK

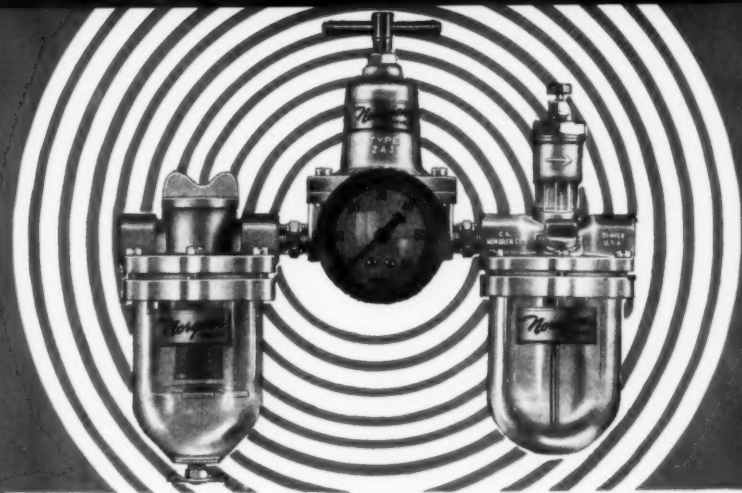


2 JAW  
CHUCK



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Norgren Lubro-Control Units automatically clean, control and lubricate air power . . . boost performance, cut wear and reduce maintenance in air driven tools and cylinders.

Compact, streamlined assembly of filter, regulator and lubricator, easy to install in any air line.

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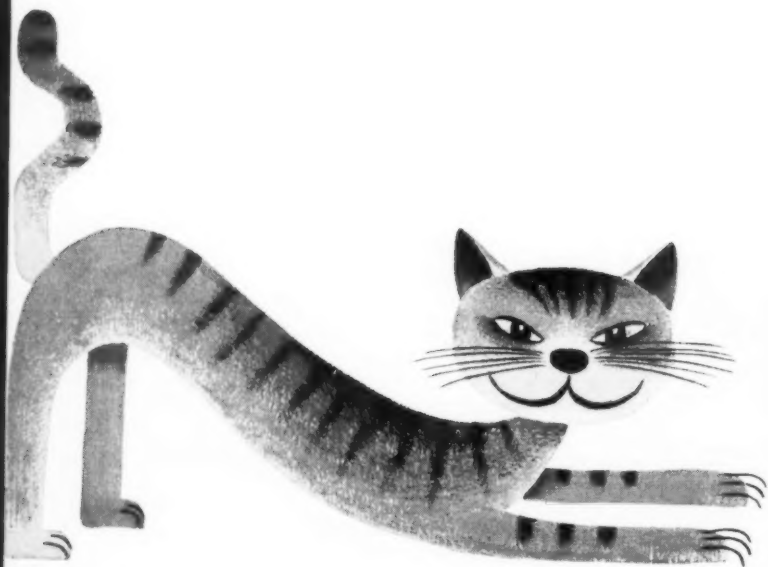
- **lubricator** oils the air that drives the tool. Protects against wear while tool operates; against rust and corrosion while tool is idle.

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# Norgren

*A grinding wheel  
has nine lives, too . . if it's a*





# ROBERTSON COOL-CUT

Have you ever seen a cat sharpen its claws? Have you noticed how it spreads them to the limit before striking, leaving plenty of space between the "cutters"?

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The experience of a foreman in the grinding department of a huge plant is typical. He had been trying to take a .0001" cut off Airdie steel, Rockwell 68. The wheel he was using was getting nowhere. The Robertson sales-engineer put on a Cool-Cut Wheel and said, "Take off .020" depth, with .020" cross-feed." The foreman tried it, and it worked! The Cool-Cut Wheel took the metal off without heating the work and with no measurable wheel loss.

Yes, Robertson Wheels have successfully demonstrated their ability to increase production and give you a substantial bonus in decreased power-costs. If you would like to know more about this revolutionary new wheel, send for your free copy of the pocket booklet "How to Buy Production Time."

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Manufacturers of Vitrified-Bonded Grinding Wheels • Mounted Wheels • Segments



# LW

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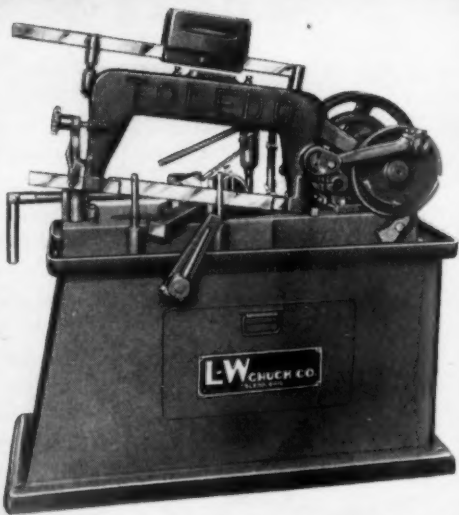
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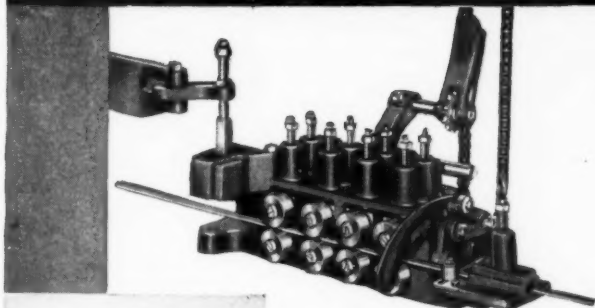
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**WITTEK** Manufacturing Co.

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*Automatic*  
**ROLL FEEDS  
AND  
REEL STANDS**

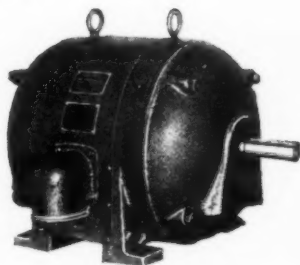




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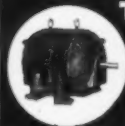
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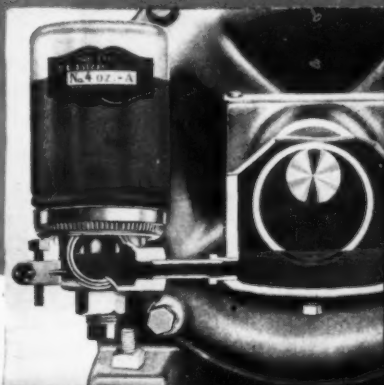
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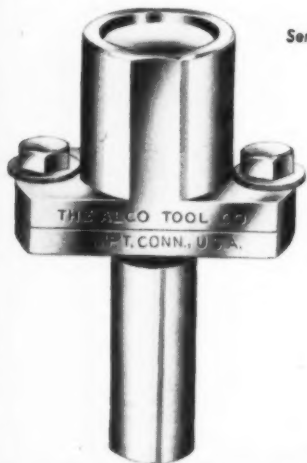
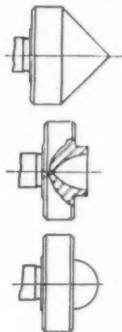
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TO SUPPORT VARYING SHAPES OF THE END OF THE WORK, SPECIAL INSERTS SUCH AS THESE MAY BE USED.



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RELEASING TAP HOLDER



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 HAVE POSITIVE "ON AND OFF" CON-  
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*Improves working conditions because Rotor grinder weighs 7 lbs. less than former electric grinder . . . is easier to handle. New tool keeps cool . . . cuts operator fatigue.*

*Find out about similar possibilities for your production!*

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THE **ROTOR TOOL** CO.

CLEVELAND, OHIO

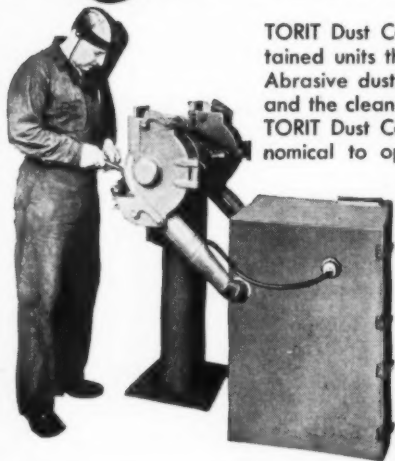
HIGH  
CYCLE

UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS



Abrasive dusts irritate workmen and slow production. Eliminate them with

## **TORIT DUST COLLECTORS**



TORIT Dust Collectors are completely self-contained units that are attached at the machine. Abrasive dusts pass through spark-proof filters and the cleaned air is recirculated.

TORIT Dust Collectors are easy to install, economical to operate, and may be moved as production layouts are changed. Sizes ranging from 1/3 HP to 3 HP, and fitting all standard grinding, cut-off and polishing wheels are available for immediate delivery. For details and latest TORIT catalog write:

**T O R I T**  
**MANUFACTURING CO.**  
 303 WALNUT ST. • ST. PAUL 2, MINN.

**BOTH \*  
AGREE  
ON**



A Model JR cylinder with adjustable cushion — one of many different types.

## Product Designers

Specialists in product design have placed their stamp of approval on Hannifin Pneumatic Cylinders because Hannifin gives them what they want: A completely standardized line of cylinders, available in an almost infinite number of combinations. Any length of stroke specified,

double acting or single acting. A wide choice of mounting styles, single or double end rods. Diameters from 1" to 12", or larger. Cushions for head end, rod end or both. Complete engineering data for working out cylinder applications in Hannifin Bulletin No. 57-Z.

# HANNIFIN



*Leakproof*  
**PNEUMATIC CYLINDERS**

*\* Also on...*  
**HANNIFIN**  
*"Packless"*



**AIR CONTROL  
VALVES!**

## Operating Engineers

Plant operating engineers like Hannifin Pneumatic Cylinders because they seldom require maintenance — thanks to Hannifin's exclusive "Leakproof" design which permits external adjustment of piston packing without disturbing any internal parts. They also like the smooth, free-running performance that comes with cylinders made

by Hannifin: TRU-BORED from steel cylinder stock; honed to satin finish by exclusive long-stroke honing process. This is also their assurance of full power performance and protection against air waste. For better plant operation, get genuine Hannifin cylinders. See your local Hannifin representative, or write.

**HANNIFIN**

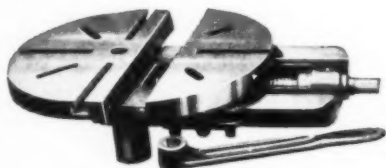
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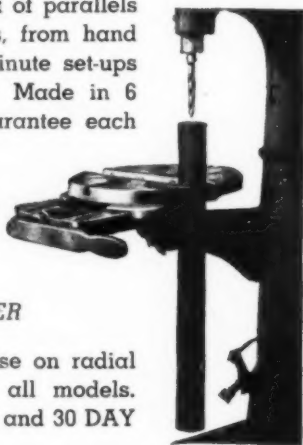
**FREE  
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OFFER**

*For Faster, SAFER Work  
in Your Maintenance Department*

Combines a drill table, a vise, a set of parallels and V block. No more lost fingers, from hand held jobs that slip. No more 30 minute set-ups for a 1 minute drilling operation. Made in 6 sizes, from 8" to 28" dia. We guarantee each Safety Drill Table will save its cost on labor alone in 6 months, to say nothing of plant down time when vital maintenance is delayed even a few minutes.

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Shows many typical set-ups, and use on radial drills. Complete specifications on all models. Covers MONEY BACK GUARANTEE and 30 DAY FREE TRIAL OFFER.



**MODERN MACHINE TOOL CO.**  
*Jackson, Michigan*

*exceptional* tool life....

## roughing and finishing

with  
**BARBER-COLMAN**  
**CARBIDE TIPPED**  
**REAMERS**

Vibration and end-play may vary from spindle to spindle on multiple reaming operations. Therefore, reamer design is even more important in controlling identical holes at each station. Barber-Colman Inserted Blade Reamers with carbide tips, used on this operation, are built with floating holders and magic-chuck drives. This permits reamers to seat themselves independently of machine conditions and produces accurate, straight, round holes.

Barber-Colman Reamers are made with irregularly-spaced blades to give smooth cutting action and finely finished work. This feature eliminates welts frequently caused by uniform spacing. Long tool life is assured with the rigid mounting provided by wedges and an adjusting collar which prevent any blade movement during reaming.

Consult Barber-Colman Reamer Engineers on your reaming problems. Quotations will be furnished on receipt of blue-prints and production requirements.

# Barber-Colman Company

GENERAL OFFICES AND PLANT 154 LOOMIS ST., ROCKFORD, ILLINOIS, U.S.A.



### JOB RECORD

Operation — Ream valve tappet holes

Material — Gray cast iron

	Roughing	Finishing
Feed —	8.32" per min.	16.6" per min.
Speed —	81 SFM	36 SFM
Tool Life —	4000-5000 holes per sharp- ening	16000 - 18000 holes per sharp- ening

Tolerance — Size .990"/.991"



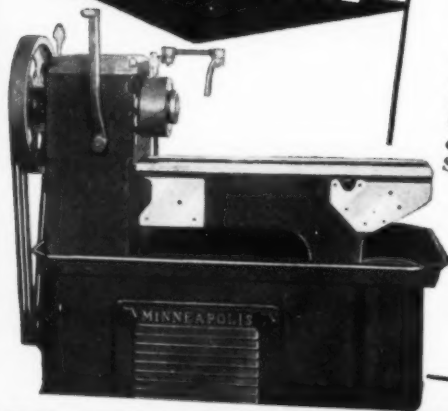
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# WHY BUY LATHE PARTS

YOU NEVER USE?

Consider this **ECONOMY** set-up!

*Here's the*  
**BASIC LATHE**



## ADD Your Choice of Drives and Equipment

Singlespeed, four speed, all-electric multi-speed and low speed chain drives.

Manual or air operation of collet, expanding mandril or chuck.

Cross-slide with hand screw or rack and pinion feed.

Six station flat turret and self-indexing stop.

Manual capstan operated carriage.

Power feeds for turret, carriage or cross-slide.

Special equipment designed for your work.

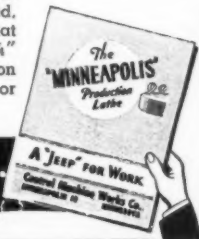
## "BASIC UNIT + PARTS" PLAN of the MINNEAPOLIS PRODUCTION LATHE

You can save money on production lathes—and further hold down your cost by adding only the equipment needed for your particular job! When you buy the MINNEAPOLIS Lathe, you get a high speed, heavy duty model with large spindle capacity—a machine that takes heavy cuts without "chatter" and increases your output. 2 1/4" Spindle capacity, 14" swing, 4 different drives. Let us quote you on a "tailor-made" lathe for your work. Simply send sample part or drawing.

## CENTRAL MACHINE WORKS CO.

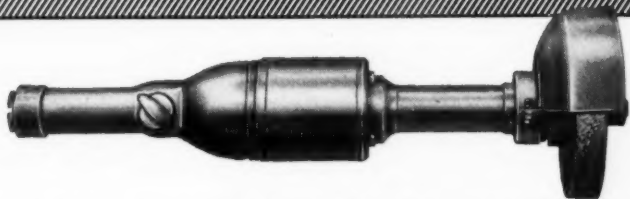
*Machinery Designers and Manufacturers Since 1890*

1253 Central Ave., Minneapolis 13, Minnesota



*Introducing*

**new line of heavy duty  
CP Pneumatic Grinders**



**for maximum removal of metal—with low maintenance**

**Steel clad spindle and motor housings**—lightweight steel tube construction can take rough handling . . . resists wear and tear.

**Constant speed governor**—holds wheel at most efficient cutting speed, from no load to full load . . . eliminates danger of overspeed when running free.

**Movable exhaust ports**—can be

revolved to any desired position and locked.

**Easy action throttle valve**—takes the jerk out of starting.

**Multiple disc air cleaner**—offers no resistance to air flow.

**Built-in lubricator**—large capacity reservoir . . . trouble-free, non-clogging, porous wick system.

Available in wide range of models for 4", 6", and 8" diameter wheels, with speeds from 2000 to 9000 R.P.M. Straight or pistol grip handles; 20" and 35" extensions; wire brush attachments, etc. Write for Bulletin SP-2068.



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TOOL COMPANY**

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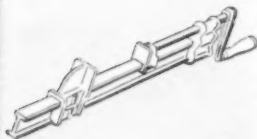
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**A**BILITY to keep pace with industry's changing needs has been the basis of Hargrave's leadership in the production of mechanic's hand tools since 1879. Skilled mechanics know that for every clamping need there's a Hargrave size from 1 in. to 10 ft. openings in 25 popular patterns.

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Cincinnati 12, Ohio**

*The Cincinnati Tool Co.*



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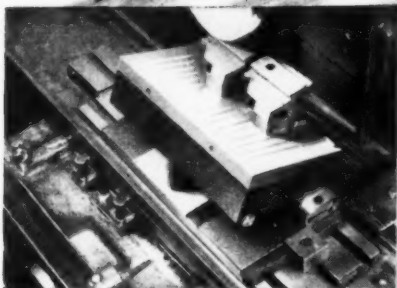
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**FASTER**

**ACCURATELY**

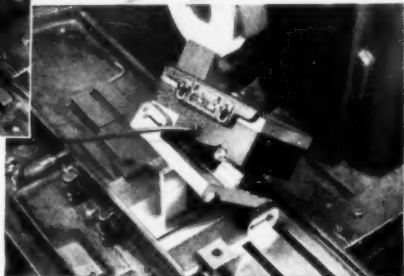
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**MAGNA-SINE**



↑ The single angle Magna-Sine for straight or single angle work.

The compound angle Magna-Sine for straight, single or compound angle work. ➡



Hundreds of companies are saving with the Magna-Sine on precision angular set-ups for grinding, jig boring, inspection and other operations where the work must be held accurately and securely. The Magna-Sine is set up with standard gage blocks by the sine bar method . . . the *positive* method for precision angular set-ups. The work is held by magnetic attraction—thus eliminating distortion of the work piece during the machining process. By simply turning a switch, the work is instantly clamped or released.

Use the Magna-Sine on all your precision angular set-ups . . . for real set-up economy—for dependable accuracy.

### THE *Robbins* INDEX TABLE FOR FAST—ACCURATE PRODUCTION INDEXING

The Robbins Index Table is indexed manually—located automatically. The number and location of the index positions is determined by the job. It is fully supported across the entire diameter against vertical thrust and a precision radial bearing provides smooth, effortless indexing—reduces operator fatigue. Available in sizes from 18" to 52" for high production operations such as drilling, reaming, tapping, boring, milling, etc. Send for bulletin. *Robbins Engineering Company, 318 Midland Avenue, Detroit 3, Michigan.*




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Roller Bearing Pillow  
Block—Cast Iron Body



Roller Bearing Flanged  
Pillow Block



Roller Bearing Pillow  
Block



Flanged Roller Bearing



## FLANGED TYPE SELF CONTAINED ROLLER BEARING

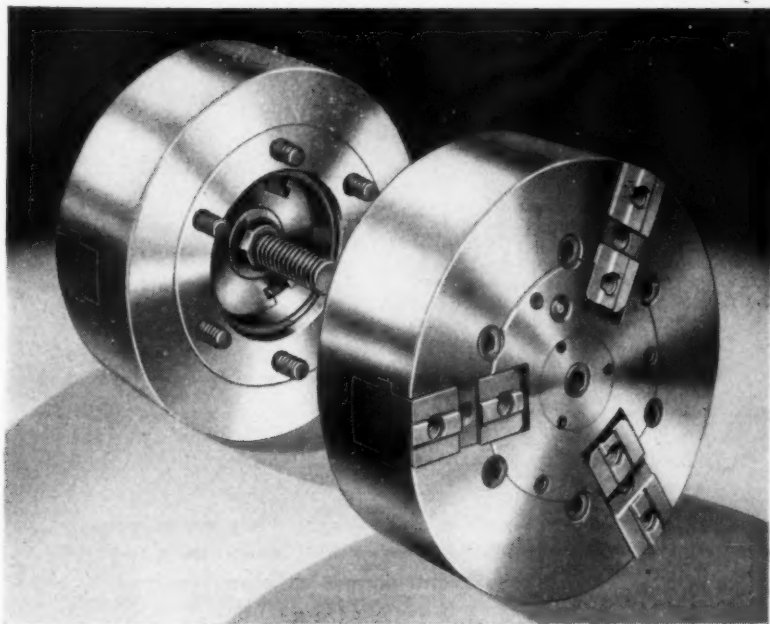
Full quota of rollers providing maximum load carrying capacity are mounted in a stamped outer casing with an inner roller race. Design effectively excludes dust and foreign matter and efficiently retains its lubrication. Used alone or supplied from stock as various models of pillow blocks, the new Heim Roller Bearing is a simple, efficient, low cost advance in roller bearing applications. Complete bulletin on request.

HEIM ALSO MAKES:  
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## Blue Chip Investment...

With a Skinner Power Chuck, work can be chucked so fast and so easily that production increases while operator fatigue is reduced. And because they are functionally designed and accurately constructed, production is more precise as well. Skinner Power Chucks are "Blue Chip" investments — bound to return good dividends for years and years.

These modern labor-saving devices have only four moving parts — a wedge and three jaws. This simplicity of construction results in several outstanding features. Initial accuracy of a high degree is more easily achieved and, with so few moving parts, it is maintained for a much longer time. A forged steel body of ample proportions to

withstand strains far greater than will ever be met, yet machined so accurately as to be in perfect balance, permits the use of higher cutting speeds for the efficient use of carbide cutting tools.

In addition, a special wedge angle design gives greater gripping power and offers a wider margin of safety. Once a Skinner Chuck grips the work it will not release, even if the air is completely cut off, until the operator is ready to remove the piece. (Did you see this remarkable Skinner Chuck demonstration at the Machine Tool Show?)

Power chucking with a Skinner Chuck is a time-saving method that offers "Blue Chip" attractions to any manufacturer who invests in

machine tools today. Full details on this accurate, long-lived, cost-cutting equipment are contained in the Skinner Catalog No. 59. Write for it today.

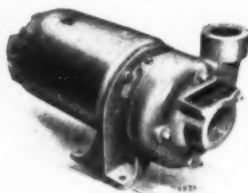
**The Skinner Chuck Co.**  
341 CHURCH STREET, NEW BRITAIN, CONN.

**Skinner  
Chucks**



**HAND & POWER OPERATED MACHINE CHUCKS — AIR CHUCK EQUIPMENT — FACE PLATE JAWS — MACHINE VISES**

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*KRVS Models D and E*



*KRVS Model F*

## There's one to fit your needs

Ingersoll-Rand Coolant and Circulating Pumps are available in various sizes and styles. They are adaptable to any new machine tool or as replacement pumps on machine tools using coolant. They're easy to install, they're compact, and better still . . . they are reliable.

Be sure to specify Ingersoll-Rand when ordering a new pump or replacing an old one. Your nearest I-R branch office or local I-R distributor is at your service.



*KRV Models  
A and B*



*KRV  
Model C*

# Ingersoll-Rand

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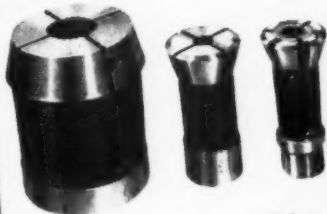
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**25<sup>th</sup>**

**ANNIVERSARY  
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For all machines—all types and sizes,  
solid and master—special collets  
for every purpose—since 1922.

### MODERN PUSHERS



For all automatic and hand screw  
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solid and master.

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For all Grid-  
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ilar auto-  
matics—non-  
warping and  
long-lasting  
—made of



alloy steel with flame-hardened face.

*Also* SCREW MACHINE  
GEARS AND REPLACEMENT  
PARTS—SCREW MACHINE  
REBUILDING

For more than 25 years America's leading in-  
dependent manufacturer of collets, pushers  
and screw machine replacement parts.

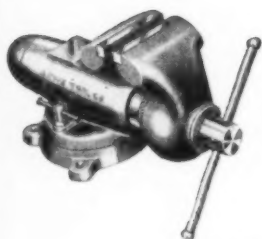


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# Superior Holding Power with ACME VISES



Acme Vises have all the essential features that will rigidly hold your work in the vise.

Furnished with Swivel Bases  
Accurately Fitted Spindle  
Unbreakable Sleeve Nut  
Even, Central Pull  
Interchangeable Jaws

Made in 11 Sizes from 2" to 6"

. . . . .

## DEPENDABLE ACCURACY

INSPECTION TOOLS made of MEE-HANITE Metal are designed to fill your various Inspection and Checking needs in the Inspection, Tool Room and Production Departments. Sturdily constructed to give you reliable, accurate service.

SURFACE PLATES    BOX PARALLELS  
SLOTTED ANGLE PLATES  
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TOOLMAKERS' KNEES  
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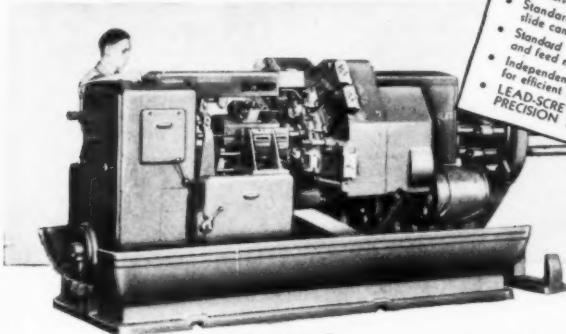


# ACME TOOL COMPANY

71 W. BROADWAY

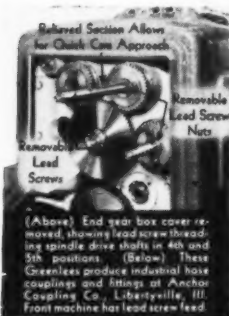
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## LEAD-SCREW FEED FOR *Better* PRECISION THREADING....

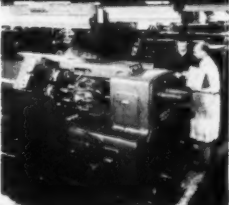


- Wide open tooling area.
- Quick main tool-slide stroke settings on graduated worm wheel holders.
- Interchangeable cross-slide tool slide cams.
- Standard interchangeable cross-and feed mechanism.
- Independently operated cross-slides for efficient metal removal.
- **LEAD-SCREW FEED FOR BETTER PRECISION THREADING.**

## HAS BEEN ADDED TO THE OUTSTANDING FEATURES OF **GREENLEE "6"** **AUTOMATIC SCREW MACHINES**



(Above) End gear box cover removed, showing lead screw threading spindle drive shafts in 4th and 5th positions. (Below) These Greenlees produce industrial hose couplings and fittings at Anchor Coupling Co., Libertyville, Ill. Front machine has lead screw feed.



Operators on Greenlees have plenty of elbow room to work in the tooling area, for changing tools, making adjustments, checking work during set-up, etc.

Change-overs are speeded by a quick and easy adjustment for the main tool-slide stroke. No cams to struggle with—just a simple setting to make on a graduated worm wheel.

Tool-holders for the cross-slides are interchangeable so any tool fits all cavities.

Feed-setting on cross slides is fast and simple, using standardized and interchangeable cams — any of which will fit any slide.

Cam-controlled threading feed is a standard built-in feature on Greenlees, including built-in drive sleeves in four positions.

Cross-slides are independently operated — permitting the set-up man to select from a wide variety of tooling arrangements and make adjustments as necessary.

AND NOW an extra feature to meet modern production demands — **LEAD SCREW FEED** for extra power and precision on threading operations. The mechanism can be added to most existing Greenlees at low cost.

### FREE LITERATURE

Learn more about these and many other valuable Greenlee features that make this machine "The Operator's Favorite". Write today for bulletins — ask for Screw Machine Literature.



**GREENLEE BROS. & CO., 1832 MASON AVE., ROCKFORD, ILLINOIS**

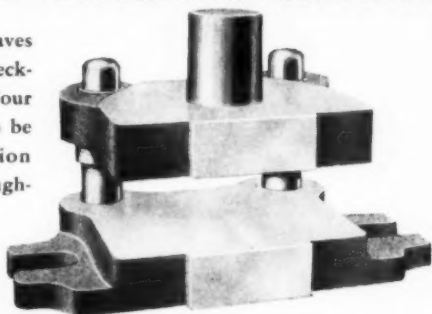
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Not a single Die Set ever leaves Producto without a strict check-up of every vital point. Your specifications are orders to be obeyed... your production results will prove our thoroughness.



### FROM NEAR-NEIGHBOR POINTS

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### and DOWEL PINS too

Make Producto your source of supply for the close tolerance die maker's accessories you need in a hurry... pins, springs, stripper bolts, screws, adapters, etc. All are neatly packed for easy identification.

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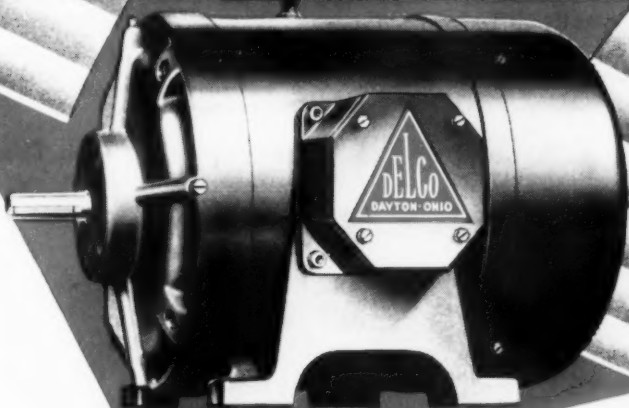
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**built to keep going**

**where the going's toughest!**



**CHECK THESE FEATURES  
OF THE NEW  
DELCO MOTOR**

Totally enclosed; fan-cooled.

Individually taped coils.

Thoroughly insulated windings.

Unit-cast, ball-bearing rotor,  
dynamically balanced; parts in-  
terchangeable end to end.

Double-shell frame with new  
simplified cooling system.

Extra-large, watertight can-  
dust box; usable in four 90-  
degree positions.

Extended, accessible mounting  
feet, cast as a unit with main  
frame.

From 1½ h.p. through 30 h.p.;  
NEMA frame sizes, 224 through  
505.

**THE NEW DELCO MOTOR**

Sand, scale, dirt and dust in the air? Forget it! Completely protected by its totally enclosed, double-shell frame, this great new Delco Motor takes all these in its stride.

*Everything* about the new Delco Motor promises a superior kind of steady, cool-running performance. New materials and new design practices make it more rugged, better ventilated and insulated. New simplicity and accessibility make maintenance a much less frequent and less costly process.

Put this really new motor to work in foundry, factory, mill or forge plant—*anywhere* conditions are tough—and watch it prove its outstanding value! Write for complete data.

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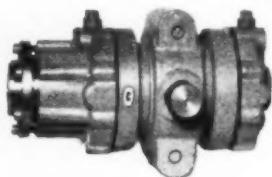
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of the Horses Heads**



**Your Assurance  
of Quality**



**"Increased Production Does Not  
Mean — Longer and Harder Work  
— Only More Efficient Work."**

**The Most Complete Line of  
Precision Made Cylinders on  
Production Basis.**



**For AIR — WATER — OIL — Pressures to 3000 PSI  
All Standard Mounting Models Available**

***For Economy and Prompt Delivery — Nationwide Sales***

**Manufacturers — Air, Water, Oil Cylinders — Power Units —  
Watertight Industrial Electrical Fixtures — Hard Maple Armature  
Wedges — Centrifugal and Rotor Pumps. Platers — Gold  
— Silver — Nickel — Chrome.**

***Some Desirable Distributor's Territories Available***

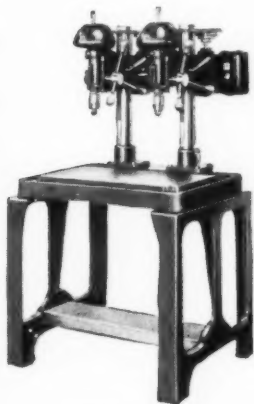
**POWER PLUS PRODUCTS CO.**

**DETROIT 7, MICHIGAN**

**FOR LOWER MANUFACTURING COSTS**

## **MORE PRODUCTION** *ON THE Drilling Line*

If you are considering ways to get more holes drilled per hour in your production lineups, look into "Buffalo" No. 15 Drills! They're arranged for quick speed and setup changes—controls are within handy reach. Even inexperienced operators do accurate work. These are precision-built machines with rigid, 2 $\frac{3}{4}$ " columns, all parts well fitted. Excellent for sheet metal work, soft metal castings. **DON'T LET DRILLING "BOTTLENECK" YOUR PRODUCTION!** Write now for facts on "Buffalo" No. 15 Drills.



### **No. 15 DRILLS**

**Keep  
Production  
Moving!**

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## **FORGE COMPANY**

**161 Mortimer St. Buffalo, N. Y.**  
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

**MACHINE  
TOOLS**

by

***"Buffalo"***

- ★ BACK SPOT  
FAGERS
- ★ BAR CUTTERS
- ★ BENDING ROLLS
- ★ BILLET SHEARS
- ★ DOUBLE END  
PUNCHES AND SHEARS
- ★ LOCOMOTIVE  
SHEARS
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- ★ RAPID ACTING  
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- ★ SINGLE END  
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IRON WORKERS
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**CONTINUOUS SERVICE—FASTER OPERATION—PEAK ACCURACY**

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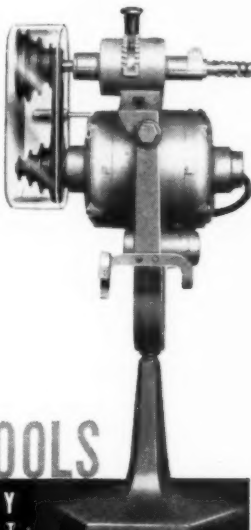


## with the JARVIS "75"

The Multi-Jarvis "75" flexible shaft machines provide the ultimate in extra power and constant high speed for use with tungsten carbide rotary files. Tough jobs are made easy... operator fatigue is held to the minimum.

The Jarvis "75" is available in bench, roller-floor (with tool tray), overhead-suspended-trolley and overhead-suspended-saddle types. Bench and floor units swivel horizontally and vertically. All models are equipped with transparent plastic guards.

*Jarvis tungsten carbide rotary files are ground-from-the-solid and are available in standard sizes in fine, standard or coarse fluting. Write for literature on Jarvis Power Tools.*



# Jarvis POWER TOOLS

THE CHARLES L. JARVIS COMPANY  
MIDDLETOWN IN CONNECTICUT

Tapping Attachments • Flexible Shafts and Machine • Quick Change Chucks and Collets • Rotary Files

THE NEW THOR CHIPPERS ARE

# BIG NEWS

## IN AIR TOOLING

NEW streamlined design  
... weight is *behind* piston  
to absorb kick-back.



### THREE SIZES!

NO. 11—1" Stroke; Weight 12 lbs.;  
Length, 12 3/4"

NO. 22—2" Stroke; Weight 13 lbs.;  
Length, 14 1/4"

NO. 33—3" Stroke; Weight 14 1/2 lbs.;  
Length, 15 3/4"

NEW design air ports deliver  
constant power even at reduced  
air pressures for faster, harder  
blows... new large drop forged  
handle.

*Write today for information or call a Thor branch for demonstration*

#### INDEPENDENT PNEUMATIC TOOL COMPANY

600 West Jackson Boulevard, Chicago 6, Illinois  
BRANCHES IN PRINCIPAL CITIES

# Thor

PORTABLE POWER

# TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY  
ELECTRIC TOOLS • MINING AND CONTRACTORS TOOL

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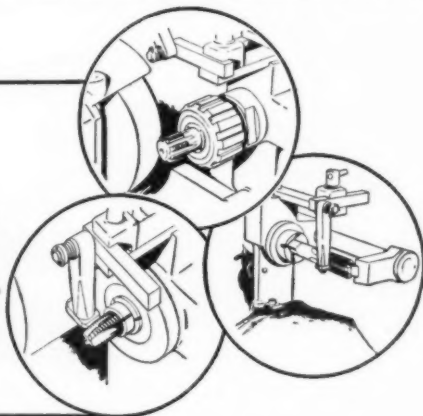
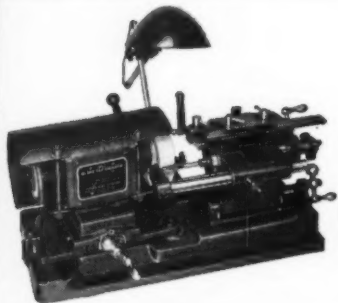
**"FORMERLY 5,000**

**NOW 40,000 HOLES PER TAP"**

**We have many similar comments in our files from satisfied users of**

Model No. 1 for taps up to 6" long

Model No. 2 for taps up to 14" long



## THE BLAKE TAP GRINDER

YOU TOO, if you use taps regularly, will find a Blake Tap Grinder one of your most profitable investments. You'll be amazed at the savings in tool and labor costs, the improved quality of threads, and the increased production — all directly traceable to using only sharp taps and having them always on hand.

With the BLAKE you can easily, quickly and accurately chamfer-sharpen taps with 2, 3, 4, 5, 6, 8 or 10 flutes — both right-hand and left-hand taps — from No. 0 to 2" diameter. All three methods of holding the tap are available: on the shank, on the O.D. of thread, and on centers. Also countersinks, 3- and 4-flute drills and reamers, engravers' bits, router bits and many other tools requiring relief on the point can be ground accurately and quickly on this versatile grinder.

*Get the full details by sending the handy coupon today.*

Please send me a free copy of the Bulletin which gives complete details on the Blake Tap Grinder.

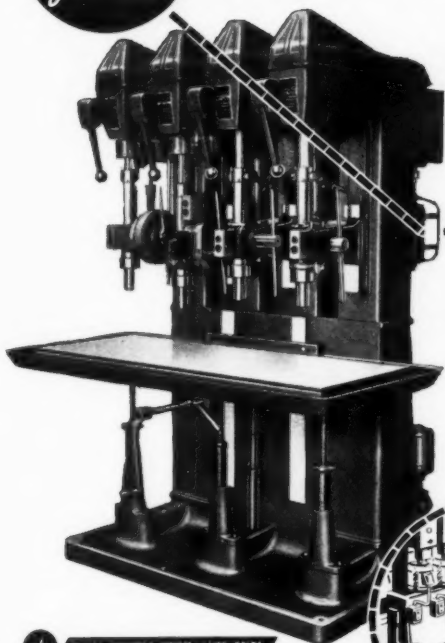
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COMPANY \_\_\_\_\_  
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**EDWARD BLAKE CO.**  
**634 COMMONWEALTH AVE.**  
**NEWTON CENTRE 59, MASS.**

BLAKE TAP GRINDERS—FILTAIRE PORTABLE DUST COLLECTORS—AMERICAN TOOL HOLDERS—BLACK  
DIAMOND PRECISION DRILL GRINDERS—WALTHAM CUTTER SHARPENERS

*Avey's*  
**PLUS**  
*features*

add up to **TOP PRODUCTION**



Each spindle of AVEY BMA-6 is individually motor-driven by standard frame constant speed motor. Foot-mounted motor easily interchanged or replaced. Standard motors can be stocked.

**AVEY TYPE BMA-6**

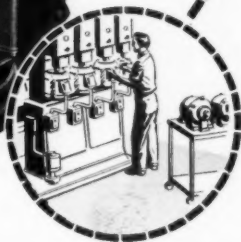
Four Spindle—12" Overhang

1st spindle—Avey-matic feed

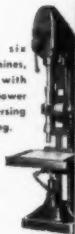
2nd spindle—Plain power feed

3rd spindle—Hand feed

4th spindle—Tapping (reversing motor)



Single to six spindle machines, equipped with hand feed, power feed or reversing motor tapping.



*plus*

**FINAL SPINDLE DRIVE—V-BELTS**

You belt used on final drive from gear box to spindle. Increases speed and sensitivity in drilling. Carries full horse power from motor to job.

*plus*

**SIX SPEED CHANGES**

On the AVEY BMA-6 six speed changes are made through selective, sliding gears. This automatic type of gear shift is controlled by a single lever at front of machine. Provides versatility and effective operation.

*plus*

**SPEEDS OBTAINED—SLIDING GEARS**

Selective, sliding gears of AVEY BMA-6 change speeds quickly and easily. Each gear is manufactured and finished by accurate, modern process, shaved, hardened and lapped. Insures smooth operation and long performance.

**CLIP AND MAIL TODAY**

**AVEY DRILLING MACHINE CO.,  
CINCINNATI 1, OHIO**

Gentlemen: Please send without obligation your new Bulletin 647.

COMPANY \_\_\_\_\_  
ADDRESS \_\_\_\_\_  
NAME \_\_\_\_\_

**Avey** DRILLING MACHINES  
CINCINNATI, OHIO

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# Like external form tools **BOKUM BORING TOOLS**

## **BOKUM TOOL**

— maintain their original form throughout the entire life—which assures uniformity of resulting product

— provide constant clearance—thereby making for uniform tool performance

— require resharpening only on top surface—thus reducing maintenance cost

— have a longer life than any other type of boring tool

## **FORM TOOL**

**AVAILABLE IN 3 STYLES**

- STYLE A — for general boring
- STYLE B — for facing and bottoming
- STYLE C — for internal threading

Ask for catalog H1139 for super high speed tools  
and for H398 for carbide-tipped.



TRADE MARK REG. U. S. PAT. OFF.

# **BOKUM TOOL CO.**

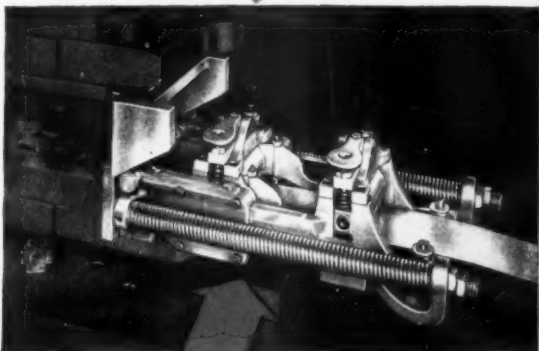
14775 WILDEMERE AVE. • DETROIT 21, MICH.

SINGLE POINT BORING TOOLS—INTERNAL THREADING, BOTTOMING AND FACING TOOLS—CARBIDE TIPPED TOOLS



# Still Wasting Time

FEEDING  
PUNCH  
PRESSES  
BY  
HAND



**Increase Your Production**  
*at least 300% with*

## DICKERMAN DIE FEEDS



Here is a dependable accurate die feed that reduces operator hours 80 to 90% . . . and increases production 300% or more.

Completely automatic, it "takes over" all hand operations. It is speedy and efficient . . . tough and rugged . . . with no wearing parts to get out of order. It is flexible enough to feed stock from any angle . . . versatile enough to easily feed *any* punch press. There are advantages to be gained even on short runs of 5000 pieces.

Start saving time and increasing production at once. A Dickerman Die Feed pays for itself in a short while.

**H. E. DICKERMAN MFG. CO.**  
321-26 ALBANY STREET • SPRINGFIELD, MASS.

Want real speed? use

## JOHNSON *metal cut-off* BAND SAW

YOU GET MORE SPEED with the Johnson because of its greater stability, the exceptional rigidity of its three-point-supported, heavy bed, and equally vital, the vibrationless stiffness with which the saw is held to the work by its wide supporting guide rolls. All this simply means that the saw blade can be pushed harder, will last longer, and will cut more accurately and closer to tolerance, which in turn means a further saving in material and machining time.

Every important dimension in the machine is GENEROUS. Bandwheels, 16" diameter, give plenty of grip on the blade and cause mighty little twisting or bending

stress. Wheel axles are extra-heavy, with large auto-type roller bearings. Pivot bar is of extra large diameter. And the capacity of the machine, 10" high, 18" wide, covers just about every cutting-off need for any shop.

Made in two types—dry cutting for general work, wet cutting for high production. Casters for quick portability if desired.

Big capacity—10"x18"  
—all you need—

Automatic, hydraulic feed, quick adjustable from front of machine. Quick-setting vise, operated from front of machine.

Stop for setting work, duplicating length cut-off.

Four motor speeds. Automatic shut-off at end of cut.

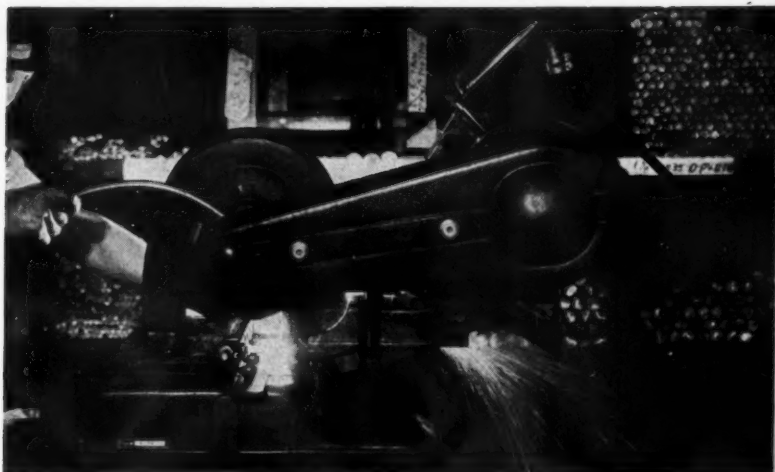


Write now for the descriptive catalog, and the address of the dealer nearest you.



# JOHNSON

MANUFACTURING CORP.  
616 CHRYSLER BLDG.,  
NEW YORK 17, N. Y.



## Let MANHATTAN solve your perplexing cut-off problems

Recent developments in both rubber and resinoid bonds have greatly increased the number of cuts per wheel, as well as improving the quality of cut.

MANHATTAN wheels are being used satisfactorily on ferrous and non-ferrous castings, steel bars, pipe, structural shapes, stone and reinforced concrete; also on light gauge tubing, hardened or soft steel, delicate alloys, ceramics and glass.

The following data picked at random from our files show results obtained with 10" diameter wheels on Delta Machines:

Material	Wheel Grade	Cutting Time	Number of Cuts
<b>Dry Cutting</b>			
¾" Dia. Steel	#211	3 Sec.	350
¾" Steel Pipe	#213	1½ Sec.	350
Angle Iron, 1½" x 1½" x ⅝"	#213	2½ Sec.	400
Shelby Tubing, 1" dia.—17 gauge	#479	1½ Sec.	228
<b>Wet Cutting</b>			
¾" Dia. Steel	#479	4 Sec.	275
¾" Steel Pipe	#479	2½ Sec.	252
Shelby Tubing, 1" dia.—17 gauge	#479	2 Sec.	337
¼" Bundyweld Tubing	#548G	½ Sec.	2090*

\* Average on 50 Wheels

### ABRASIVE WHEEL DEPARTMENT



## RAYBESTOS-MANHATTAN INC.

*Keep Ahead with Manhattan*

MANHATTAN RUBBER DIVISION

PASSAIC, NEW JERSEY

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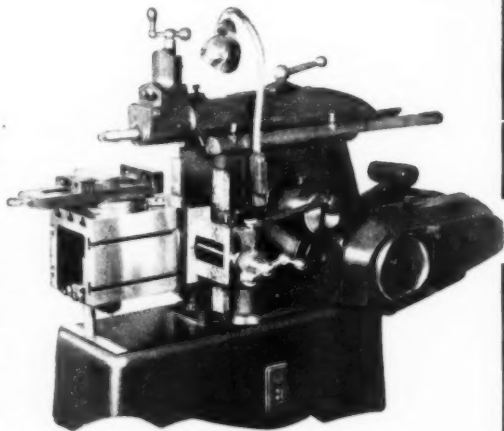
# SHAPE-RITE SHAPERS

ACCURATE — VERSATILE — DURABLE — DEPENDABLE

You can depend upon the built-in accuracy and durability of Shape-Rite Shapers to withstand day-in and day-out capacity production. The speedy set up features and ease of operation will increase the output of precision work. Shape-Rite Shapers are versatile, and will handle any type of work within the capacity of eight-inch stroke shapers. Unexcelled for Tool and Die Makers and small instrument manufacturers.

All of the working surfaces on Shape-Rite Shapers are ground and hand scraped, and each part is closely fitted to insure positive accuracy and longer life. All of the gears and drive shaft are mounted on anti-friction bearings. The gears are enclosed and run in oil with the exception of the bull gear and pinion. Lubrication throughout is provided with standard oil-mite fittings.

The bull gear and pinion are right hand cut helical angle, the drive gear is cut left hand helical angle, which gives a silent herringbone gear effect for extra smoothness and eliminates gear tooth reproduction on your work. An extremely fine finish can be produced with Shape-Rite Shapers.



8" STROKE HI-DUTY MODEL

The column is heavily constructed, cross ribbed and made of special alloy cast iron. The ways on the ram are Vee type and are extra long and extra heavy to avoid deflection. The tool head is rugged, heavy constructed to accommodate a heavy tool holder graduated in degrees, and swivels to any desired angle. The rocker arm is linked at the top to the ram drive head, and is equipped with needle point bearings. The slide block is made of tool steel, hardened, ground, and closely fitted to insure long life and to reduce wear. The cross rail and table saddle are heavily constructed for extreme rigidity. Shape-Rite Shapers are furnished with either plain or swivel tables. The swivel tables are completely flexible for any type of production work. The motor is mounted on a hinged bracket for convenience in changing speeds, and maintaining a tight belt. Standard equipment consists of steel faced jaws, swivel base vise, tool post wrenches, and motor drive arrangement, less electrical equipment.

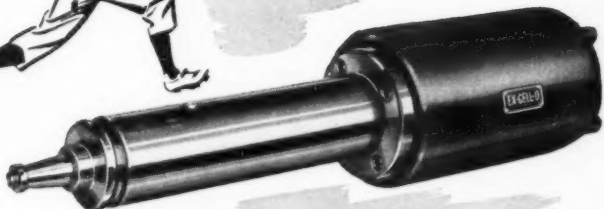
See your local dealer or write to Dept. B-248.

## Sales Service Machine Tool Co.

2363 UNIVERSITY AVE. ST. PAUL 4, MINNESOTA

**MORE WORK**

**LESS PLAY**



## With EX-CELL-O Grinding Spindles

It's the bearing that makes the spindle. In the Ex-Cell-O Grinding Spindle it's the precision of the bearing that keeps end and radial play at a minimum, permits high production speeds without loss of accuracy. That is why machine tool and other manufacturers rely on Ex-Cell-O grinding spindles for fast, accurate and economical production.



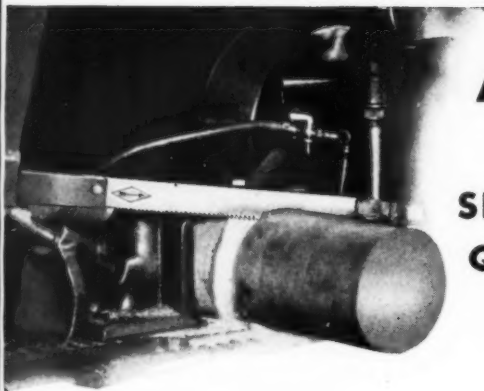
Write for this new complete catalog on Ex-Cell-O Precision Grinding Spindles. Bulletin No. 25962.

48-8

**EX-CELL-O CORPORATION**  
**DETROIT 6 MICHIGAN**



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## Can You Answer "Yes" TO THESE SIX IMPORTANT QUESTIONS?

**I**f you can answer "yes" to all six, then you can be sure your production hack saws are operating most efficiently. The Barnes Hack Saw Production Calculator (free on request) has information that will enable you to answer "yes" to some of these questions; Barnes Service Engineers can give you the correct answers to all of them!

Why not let us match our top quality hack saw blade plus our knowledge of metal sawing against your cutting problems. Then you are assured your production power hack saws will deliver maximum cutting efficiency.



Your Barnes Distributor will have a Barnes Service Engineer call on you whenever you say—no obligation.

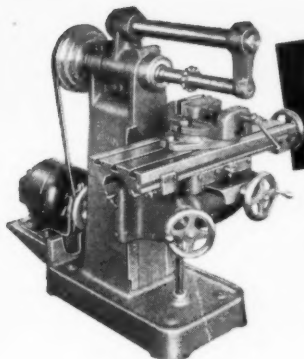
- 1 Am I obtaining maximum number of square inches cut per blade?
- 2 Am I using correct feed and speed to balance production against tool cost?
- 3 Do I use correct length and pitch of blade for size and type of material being cut?
- 4 Am I nesting materials in the most efficient manner?
- 5 Am I cutting my material in the shortest possible time consistent with normal blade life?
- 6 AM I USING THE RIGHT BLADE?



ESTABLISHED 1919

**W. O. BARNES CO., INC.**

DETROIT 14, MICHIGAN



# BENCHMASTER pays off 5 ways!

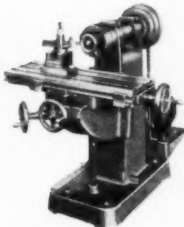
Where else can you find a low cost tool with so many cost-cutting possibilities?

**1 FOR HORIZONTAL MILLING** quill and overarm slip quickly and snugly in place. Timken Tapered Roller Bearings provide a rigid spindle support at high speeds as well as low. No. 2 Morse Taper. 12½" horizontal table travel with a big 6" x 18" table area.



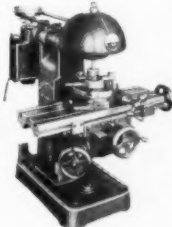
## 2 WANT A VERTICAL MILLER?

The same machine is quickly converted by substituting this special head. Again Timken Tapered Roller Bearings give smooth, chatter-free performance over a wide speed range. Accessories available: Full line of Benchmaster collets and drawbar; swivel-base vise.



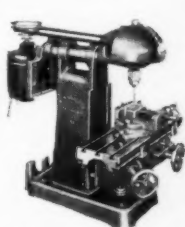
## 3 WHEN IS A MILL NOT A MILL?

Here's a handy kink to obtain extra *lathe* facilities for facing, turning, forming, etc. Benchmaster Accessories required: Tapered Adapter and Tool Block. By lowering knee position and raising tool you can swing up to 23°. Exceptional capacity!



## 4 QUICK CHANGE ARTIST

Here's the Benchmaster converted to a grinder! Free-rolling bearings maintain high spindle speeds without overheating or risking bearing injury. Grinds internally, surfaces, sharpens cutters, etc. Note Benchmaster 6" Rotary Table—a fine accessory.



## 5 AND NOW IT'S A DRILL PRESS

The No. 2 Morse Taper in spindle accepts standard Jacobs Chuck Shank. Raising table feeds work into drill. With this setup, drilling layouts is easy—simply measure off correct hole spacing with the lead screws.

- ★ For Precision
- ★ For Quality
- ★ For Value

**You can't beat a  
BENCHMASTER!**

**NOTE:** BENCHMASTERS are also available with rack and pinion feed. For production work this provides exceptionally fast operation.

**BENCHMASTERS** are accurately built with all the care and precision of larger, more expensive tools . . . yet may be purchased for a fraction of big machine cost! Get our circulars on all BENCHMASTER EQUIPMENT!

Write Dept. M.T.  
for information

**benchmaster**

MANUFACTURING COMPANY  
1015 WEST 110th STREET  
LOS ANGELES 4, CALIFORNIA



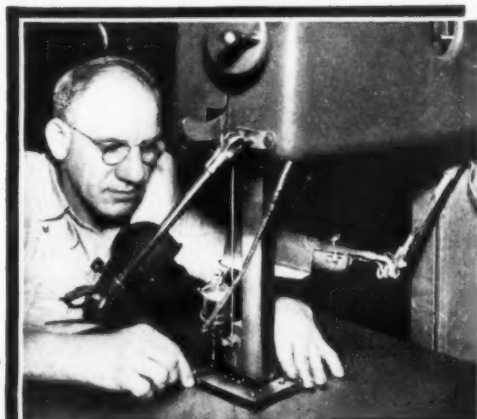
See our exhibit at the ASTE show March 15-19, Booth 603, Cleveland Public Auditorium.

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# *Specify* ATLANTIC

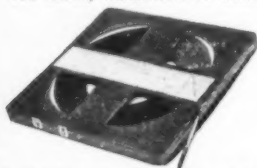
## BAND SAW BLADES

*For  
Smoother*



## CONTOUR CUTTING

*A*TLANTIC SAWS meet all of your requirements for a superior blade on complicated die and fixture radius cutting. ATLANTIC specializes in accurate milled and precision set teeth, hardened to exact temper.



Atlantic's strong, practical box, plainly marked on sides and top. Remains in good condition until entire coil is used.

ATLANTIC'S special alloy steel insures longer wear and easier welding.

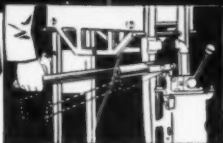
ATLANTIC'S one temper saw for all metals reduces stock you have to carry. Cut to length and welded, ready for use. Packed in strong Atlantic box. Write for new Atlantic Catalog.

*Atlantic Saw Mfg. Co.*  
INCORPORATED

Exclusively Manufacturers of Band Saw Blades  
153 Brewery St., New Haven, Conn.



# These **KRW** Hydraulic Arbor Press Features



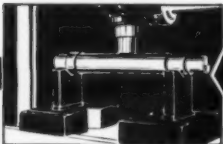
**Fast Action**, cylinder is filled as ram travels to work. You get tons of pressure with first pump stroke.



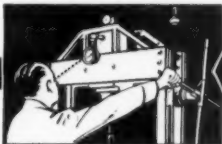
**Finger Tip Control** opens and closes valve in a jiffy. No gripping effort assures easier, faster operation.



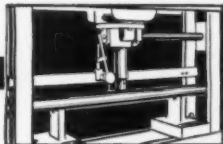
**KRW Built-in Mechanical Press** permits up to 3 ton pressure for straightening small diameter work.



**One Piece, All Steel V-Blocks** have machined surfaces for greater accuracy; usable upright or inverted.

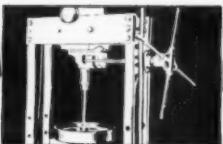


**Highly Visible Pressure Gauges** are mounted where they can be quickly checked. Read in tons and pounds.

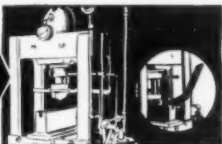


**Micrometer Dial Attachment** permits great accuracy in checking work without removing from V-block.

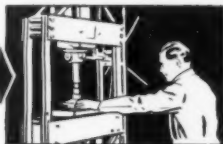
## Reduce Costs ON THESE AND OTHER DAILY *Production Jobs...*



**Broaching** a key way in a flywheel. 7½ inch ram travel makes many broaching jobs practical on KRW Presses.



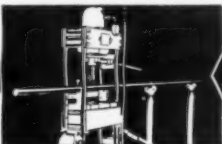
**Bending** in production lots with simple, inexpensive dies is easily done on low-cost KRW Hand-operated Presses.



**Pressing** of all types is efficiently handled. Adjustable bed makes pressing on long shafts a very simple operation.



**Riveting** with KRW Riveting Attachment is simplicity itself. Many KRW Presses are used for this type work.



**Straightening**, especially on long work, is easy on a KRW Press because of its special open end construction.



**Blanking** is easy with simple die set for short-run operations. Releases regular equipment for quantity production.

Write for the  
**NEW  
KRW**  
Catalog.....



K. R. WILSON, 215-217 Main St., Buffalo 3

Please mail me a copy of your  
Hydraulic Arbor Press Catalog

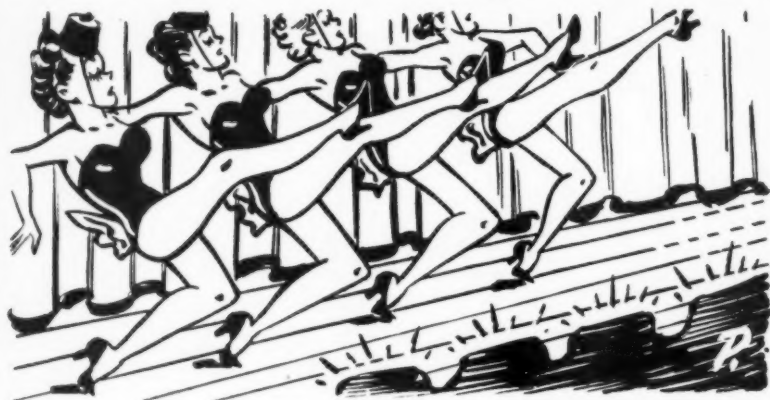
**K·R·WILSON**

215 MAIN STREET, BUFFALO 3, N. Y.

Name .....

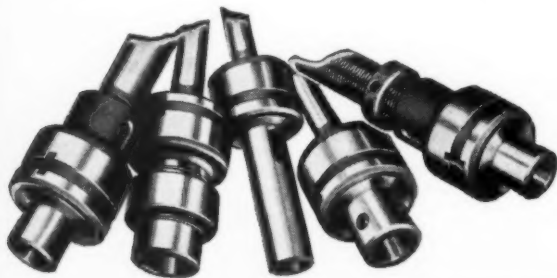
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# Perfect Alignment



## with GLENCO Floating Tool Holders

Compensating movements under load achieve positive correction of misalignment on hand and automatic screw machines, Garvin tapping machines, adjustable multiple spindles, tapping machines of all types, drilling machines, all types.



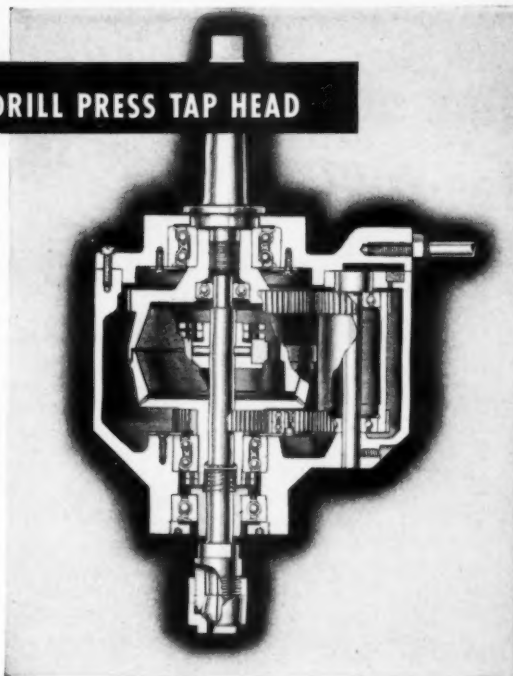
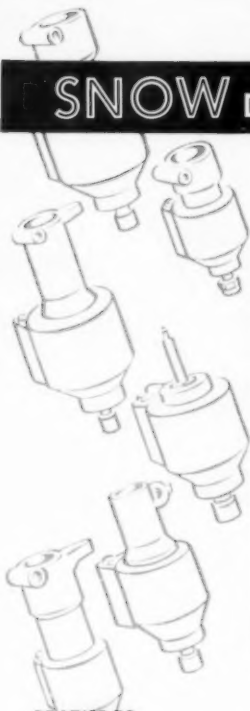
*Any stock size will be sent you for your inspection and test for 30 days, subject to return if unsatisfactory.*

THE J. C. **GLENZER** CO., Inc.

6465 EPWORTH BLVD.

DETROIT 10, MICH.

## SNOW DRILL PRESS TAP HEAD



### FEATURES:

- Drive shell hardened and ground.
- Spindle in balance.
- Light weight clutch
- Spindle bushing revolves with bearing.
- No lateral float.
- Collets ground throughout.
- Eight ball bearings.
- 2:1 reverse speed.
- Hardened alloy gears and studs.
- Delivery from stock.

The SNOW Drill Press Tap Head is the same unit as used on the SNOW Full Universal Tapping Machines. It is the only Tap Head designed and manufactured for a machine tool by a machine tool builder.

Engineers and mechanics will recognize the rigid, sturdy construction; and operators will vouch for length of service, ease of operation, and quality of work produced.

Eighteen years of production testing, and thousands of installations have proven the advantages of using a precision built drill press tap head.

These units are available in three sizes—0 through  $\frac{1}{4}$ "; No. 6 through  $\frac{3}{8}$ "; and No. 10 through  $\frac{1}{2}$ "—both Morse taper and quill clamp styles are in stock.

**SNOW MANUFACTURING COMPANY**

441 EASTERN AVE., BELLWOOD, ILL. • SUBURB OF CHICAGO

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One of the 4 is **EXACTLY RIGHT**  
for your metal cutting...



## **DISSTON** **BAND SAWS**

No matter what metals you cut nor at what speeds you operate, Disston has the right band saw blade to speed up your work, reduce down time and cut costs.

Regular type for normal high speed cutting.



Reinforced type for heavy-duty, high speed cutting.



Buttress tooth pattern for speeds of 3,000 f.p.m. and over.



Regular type for normal low speed cutting.

### **HARDENED THROUGHOUT**

For high speed cutting of non-ferrous metals, plastics and many other materials. Two types (Regular and reinforced). Also recommended for friction cutting of ferrous metals at speeds of not less than 12,000 f.p.m. All sizes.

### **HARD EDGE, FLEXIBLE BACK**

Hardened on tooth edge only for greater flexibility and longer life. Two types (Regular type for general metal cutting; Buttress tooth specially recommended for magnesium and aluminum alloys). All sizes. 100 ft. coils,  $\frac{1}{8}$ " to  $\frac{1}{2}$ ", packed in the handy Disston Safety Reel.

### **ANOTHER COST-CUTTING TIP**

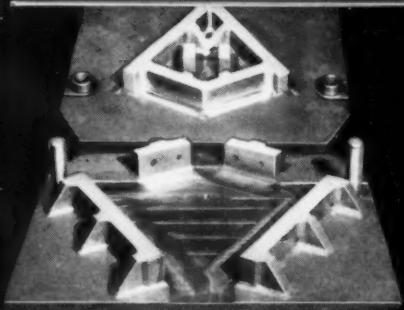
Use these Disston Metal-Cutting Tools:  
FILES... HACK SAW BLADES... CIRCULAR SAWS... CARBOLOY FITTED CIRCULAR SAWS... TOOL BITS.



Order from your Disston Distributor,  
or write direct for further particulars

**HENRY DISSTON & SONS, INC., 249 Tacony, Philadelphia 35, Pa., U.S.A.**

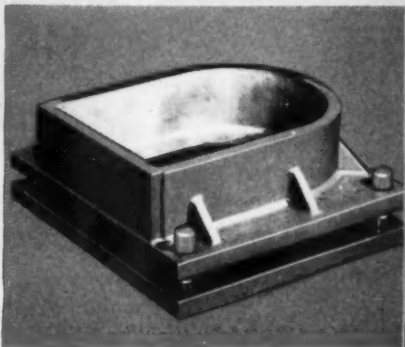
*In Canada, write: 2-20 Fraser Ave., Toronto 1, Ont.*



## DANLY SPECIAL-PURPOSE DIE SETS



**The same DANLY Precision**



THE design, shape, size of a die set is determined by its purpose. Many tool designers and engineers have found that only *specially* designed and constructed die sets can do the job efficiently. Torch cut pockets, slots, bored die pockets, planed or milled keyways, drilled knockouts, slug or hold-down holes, welded steel mounting pads—all of these operations and more can be performed at Danly during production of the die set.

This service can be especially valuable to you in the production of large die sets. Additional cutting and welding operations, so easily handled at

Danly, may cause difficulty in the die shop or your own tool room where equipment is not specifically suited to large work.

The die sets shown on this page are typical of the kind of work performed in Danly's well-equipped shops. These sets are widely different, but all have the same *Danly Precision*. Freely consult Danly's engineering department for quotations.

**DANLY MACHINE SPECIALTIES, INC.**

2100 South 52nd Avenue • Chicago 50, Illinois

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## DANLY *Special* DIE SETS

MACHINED TO YOUR SPECIFICATIONS

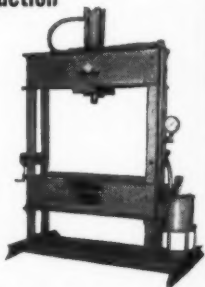
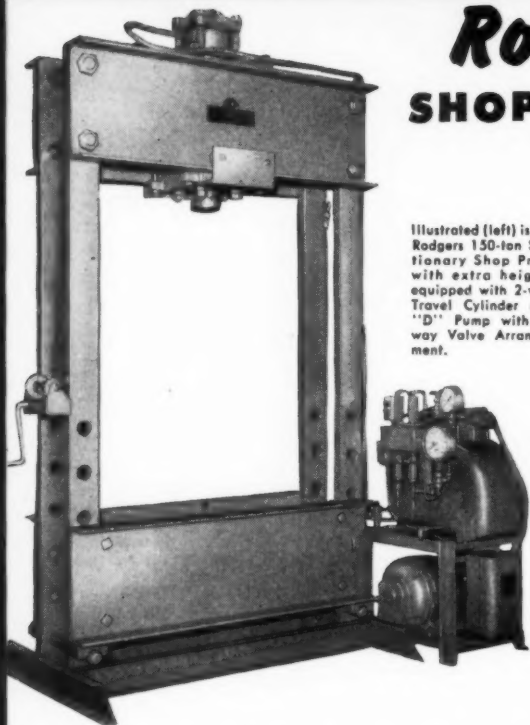
# Rodgers SHOP PRESSES

★ Flexible in Performance

★ Versatile in Use

★ Rugged — Durable in Construction

Illustrated (left) is the Rodgers 150-ton Stationary Shop Press with extra height, equipped with 2-way Travel Cylinder and "D" Pump with 4-way Valve Arrangement.

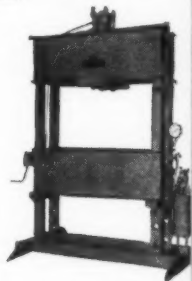


The Rodgers "Sixty" — 60-ton Shop Press (shown above) takes care of those miscellaneous jobs that waste so much time and labor. Available with hand operated pumps, or with gear head motor drive, also powered with "D" pump power unit.

pressing, squeezing and forcing, there is a Rodgers Press to meet your requirements. These rugged, flexible shop presses are available in 60, 100, 150 and 200 ton sizes. (300 and 400 ton capacity presses are available upon special order). They all embody the Rodgers design and performance features: Bolster is raised and lowered by a hand crank . . . alloy steel pins can be adjusted to allow desired opening . . . cylinders may be had with one or two way travel in ram travel lengths, from 6" to 14" — frame is of strong, heavy rolled steel plate. Power is supplied by hand pumps or motor driven pumps.

Save time and labor on your jobs with a Rodgers Shop Press. Prompt delivery on any standard model.

Send for catalog giving complete descriptions, illustrations and specifications of Rodgers Shop Presses.



Rodgers 100-ton Stationary Shop Press powered with 4-Speed Hand Operated Hydraulic Pump, also available with "D" pump power unit. Please note that on all presses the cylinder is movable across the entire width of press.



Shop Presses

## Rodgers Hydraulic, Inc.



Crawler-Track Presses

HYDRAULIC POWER EQUIPMENT

7453 Walker Street

St. Louis Park, Minneapolis 16, Minn.



Pump Power Units



**Namco Style DBS Vers-O-Tool  
for Brown & Sharpe Automatics**

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*At top indexing speeds*

At last—here's a die head that's built for easy, positive resetting, yet cannot open under rapid indexing.

And the adjustable stop for opening provides accurate-length thread. No length adjustment is necessary after grinding the chasers. With this unique design you can thread up close to shoulders, too.

Chasers and blocks are interchangeable, size for size, with styles DR and DS Vers-O-Tool heads. That means you get

all the advantages of the famous Vers-O-Tool design—fewer parts, hardened and ground throughout; long-life circular chasers, regrindable through a full 270°; micrometer gage checking for accuracy of grinds and quick diametric adjustment.

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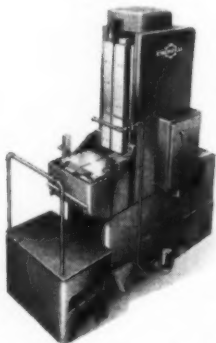
## SINGLE RAM PULL-DOWN

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## PULL-UP

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*Broaches*  *Broaching Machines - Broaching Equipment*

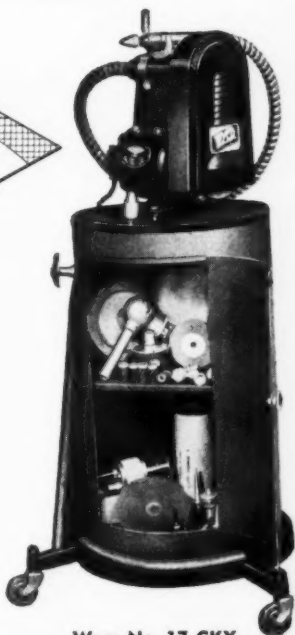


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Shaft 10-P, 5-ft. 3 speeds: 1400—  
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Cabinet 32" high. Shipping weight  
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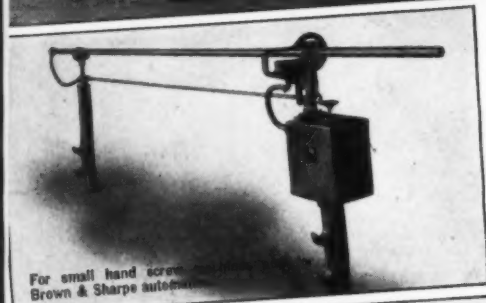
For all hand screw machines from 1" to 24"

## LIPE PNEUMATIC BAR FEEDS

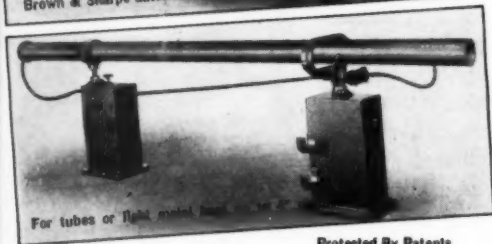
Actually, the Lipe Pneumatic Bar Feed does every part of the feed job except to replace the bar. And does it easily, automatically, rapidly and safely.

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- Feeds stock bar automatically into spindle.
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For small hand screw machines Brown & Sharpe automatic



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Special heavy-duty machine for bar stock and tubing up to and including 8" dia., in standard lengths.

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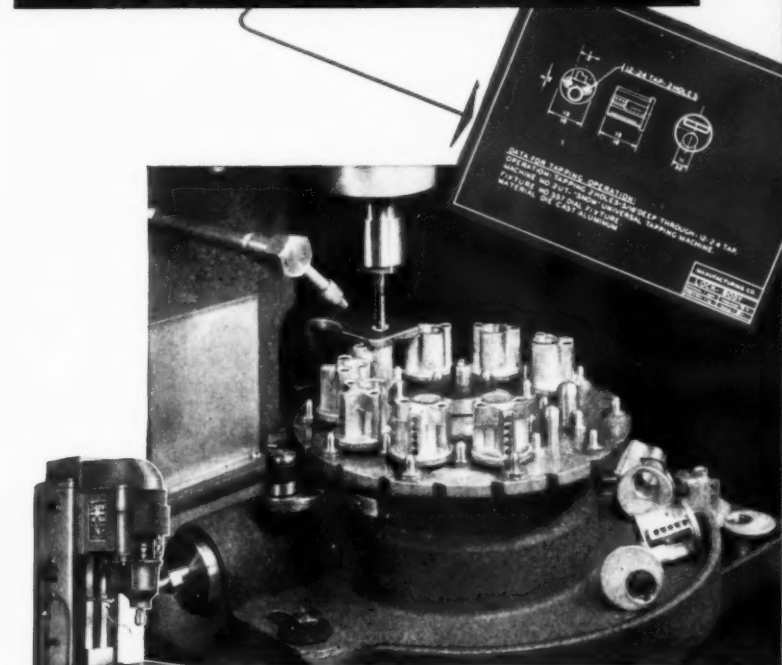
- Bar feeds for standard bar stock up to and including 2½" dia.; and lightweight bars and tubing up to and including 4" dia.
- Safe and fool-proof. Eliminates feed fingers, feed finger tube, and all other parts related to feeding in the screw machine.



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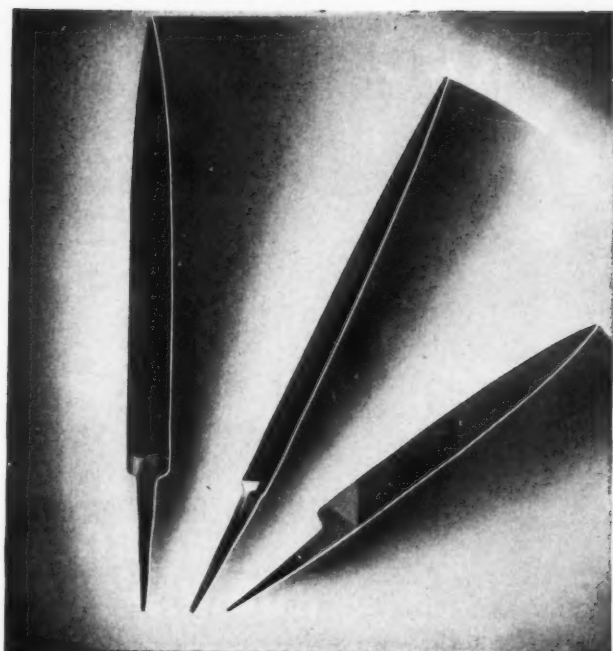
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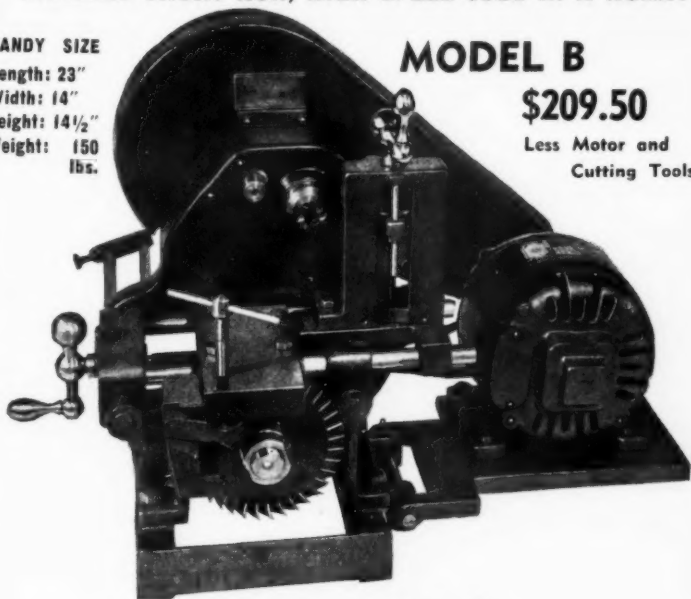
Height: 14½"

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**\$209.50**

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COMBINATION MILLING MACHINE  
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Automatic stop may be set to cut lengths up to 15". Handles bar stock of any shape from ¼" to 1" dia. Use standard 5" by 3/32" or ½" metal slitting saw. Mills flats, tangs, squares, Woodruff key slots and keyways. Automatic depth stop. 1-1/3" vertical carriage travel. 2-5/16" horizontal carriage travel. Requires ¼ H.P. motor, 1750 R.P.M.

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# Why "M-11" produces



## MORE TAPPED HOLES PER TAP

M-11 is a chrome-cobalt high speed steel used exclusively by Detroit Tap and Tool Company for taps, thread gages and thread milling cutters. Some of the reasons for its use are

**COBALT . . .** Takes human element out of hardening. **AUTOMATICALLY UNIFORM HEAT-TREAT . . .** also increases "red hardness."

**CHROMIUM .** Increases toughness and strength. **LESS BREAK-AGE . . .** Deeper, more uniform hardness penetration. **SHARPENING DOESN'T CHANGE IT . . .** Resists corrosion . . . No quenching. **PROTECTS AGAINST MINUTE HEAT CRACKS AND WARP-AGE . . .** Greater abrasion resistance. **MORE PIECES PER SHARPENING.**

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WE'VE NEVER "SHUT DOWN" A LINE YET!!



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HSS TAPS, THREAD  
MILLING CUTTERS &  
THREAD GAGES

MACHINE and TOOL BLUE BOOK

February, 1948



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Amazing production economies with DoALL precision bandsaws (19 models). Fast slicing of all materials from wood, rubber, cloth, to hardest metals and tungsten carbide, glass, ceramics. Ask about DoALL research service. Free movie for industrial groups, schools, etc.

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CUTTING TOOLS • GAGES • MACHINE TOOLS

# STOP DUSTS

*With Low Cost Individual*  
**DUSTKOPS**

Dustkop Vapor Collectors stop mist and vapor from thread grinders, screw machines with the same low cost efficiency that Dustkop Dust Collectors stop dust and lint from grinding, polishing and buffing. They save heat. They also reduce colds.



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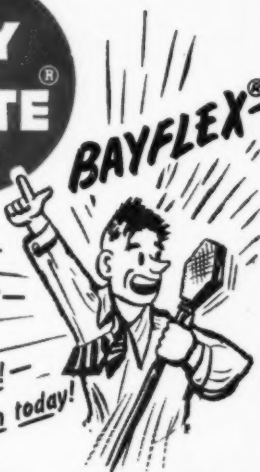
*Time saver—*

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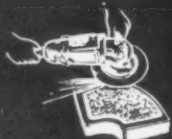
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Yes, where heavy duty portable grinders and sanders are used the jobs can now be done much faster—easier—cleaner. No wonder that BAYFLEX is so popular with management and operators alike!

The merits of this new product are many . . . the production possibilities unlimited. To appreciate the full value of BAYFLEX however, you must see it in operation. Ask for a demonstration at your plant. No obligation.

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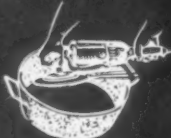
**Top Performance Consistently Duplicated**  
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Unexcelled for cleaning castings.



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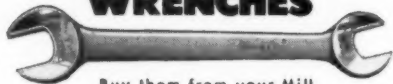
A "MUST" for metal-fabricating shops.



more and more  
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MACHINE and TOOL BLUE BOOK

February, 1948

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**CARBON AND HIGH SPEED**

Now included in the Daniels line of reamers are the three illustrated at the left. Produced by expert craftsmen and from fine steel . . . the quality of which is carefully controlled in every step of manufacture . . . Daniels Reamers offer long and low cost service to users.

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**C. REAMER FOR BIT BRACES** . . . This is the same reamer as above made with a bit brace shank instead of a "T" Handle.

### REAMER SETS

Hand reamers . . . center reamers . . . lathe mandrels . . . in sets packed in hardwood cases are also available from Daniels, an organization which has concentrated its facilities and "know-how" on the manufacture of precision and top quality products. Write today for the Daniels bulletin which lists, in convenient tables, the various sizes, types and prices. It's free . . . and helpful, too.



Daniels Reamers can be purchased direct from the factory . . .  
If not available from local suppliers . . . Immediate delivery!

## N. J. DANIELS TOOL CO., INC.

47 WASHINGTON STREET, HAVERHILL, MASSACHUSETTS

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DIAL COMPARATOR No. 13  
LONG RANGE INDICATOR No. 282

## DECIMALS AND DOLLARS

When you want to measure those decimals with maximum dollar savings, do it with an AMES DIAL COMPARATOR such as Model No. 13 shown above. Quickly and easily set to the required dimension. Maintains its setting even with rough usage. Gives instant, *accurate* readings — independent of the human factor. You'll find no other Comparator gives you such high production while saving so much in time and labor.

The 8"-square cast-iron base may be fitted with V-blocks, anvils, or stops of various kinds. The indicator-holding bracket extends 4" over the base and is easily adjustable on the 9" column. Measuring capacity is 6". Net weight 16 lbs.

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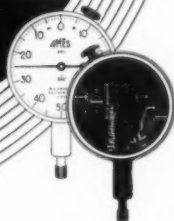
For information on our full line of Comparators and many other measuring instruments, address our Home Office:

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**B. C. AMES CO.**

Mfr. of Micrometer Dial Gauges  
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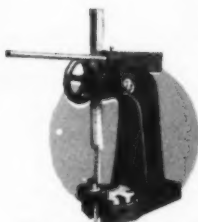
ROUND OUT YOUR TOOL CRIB

*Get's keyways for you in one minute*



WITH ONE OF THESE

*Threadwell* KEYWAY CUTTER SETS



*Use a Threadwell Arbor Press to go with your Keyway Cutter Set and for general service around the shop! Ask your Threadwell Distributor to show you this light, strong, inexpensive Press. Takes work up to 14" dia. Hand lever—40 to 1.*

When you want a keyway in a gear, a collar, a coupling, a milling cutter, a pulley hub — you want it *now*, not dollars and hours later.

When you have this Threadwell Set all you do is drop the right bushing in the bore, insert the cutter of the desired keyway width in the bushing slot, press it through once, and again with shim to get the exact depth, and you're done — in less time than it takes to tell!

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Made to the same standards of quality and precision as *Threadwell Taps and Tools of Distinction*.

*Delivery on standard items  
now being made from stock*

SOLD EXCLUSIVELY BY MILL SUPPLY DISTRIBUTORS  
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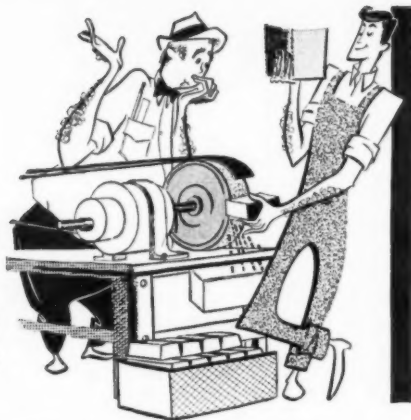
**THREADWELL** TAP AND DIE COMPANY • GREENFIELD, MASSACHUSETTS, U. S. A.

CALIFORNIA OFFICE, THREADWELL TAP & DIE CO. OF CALIF., 1322 SANTA FE AVE., LOS ANGELES 21

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"TOOLS OF DISTINCTION"

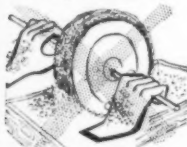
"Look, Hotchkiss! We replaced set-up wheels with Armour belts to increase production, not to help you keep up with the Book of The Month!"



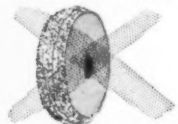
## WHY USE COATED ABRASIVE BELTS?



No glue to mix!



No wheels to dress!



No uneven surfaces!

**They grind Faster, Better!** The urgent need for faster, better production is responsible for the conversion to the abrasive belt backstand method of grinding and polishing from the old set-up method. Coated abrasive belts when worn take 75% less time to replace than is needed to dress a wheel. They reduce inventory problems due to elimination of wheels, glue, cements and various grains.

**They are More Accurate!** Accuracy of the work never varies regardless of the wear on the belt. Furthermore, these coated abrasive belts greatly reduce the danger of discoloring, warping and flowing caused by frictional heat.

**They are More Economical!** Abrasive belts do not require trained personnel needed to dress set-up wheel. They also improve quality of work with less operator fatigue, thus boosting production while lowering costs.

Armour's uniform-factory-made abrasive belts are only part of Armour's complete line of abrasives designed especially to give you better performance, longer wear, greater economy. Come and talk over your grinding and polishing problems with Armour's technical representatives.

**ARMOUR and Company**



*Coated Abrasives Division*

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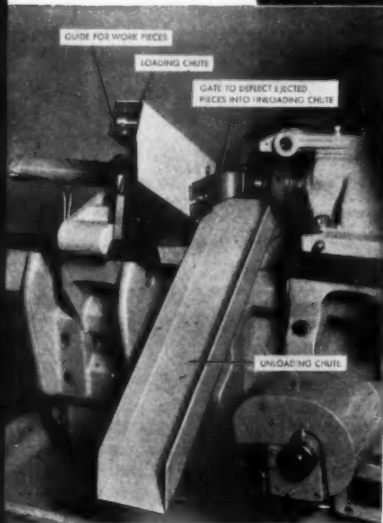
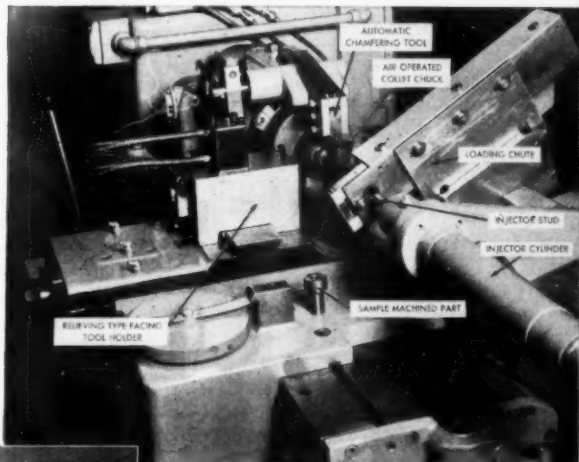


# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE Lo-swing PEOPLE" SENECA FALLS, NEW YORK

## AUTOMATICALLY LOADED IMP LATHES CUT MANUFACTURING COSTS

Automatic Loading enables the machine to produce to its full mechanical efficiency by eliminating the human equation.



**Problem:** To finish face and chamfer bore of pump gear true with bearing diameter.

**Solution:** A Lo-swing IMP Lathes was fitted with an injector type automatic loader which provides a far more completely automatic cycle, entirely eliminating hand loading.


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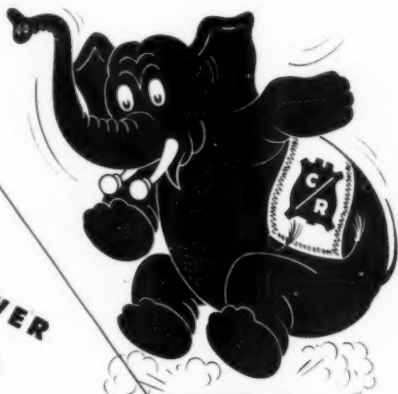
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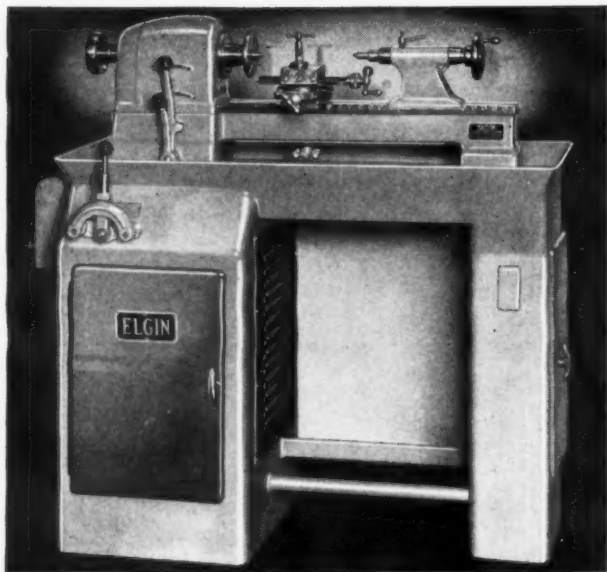
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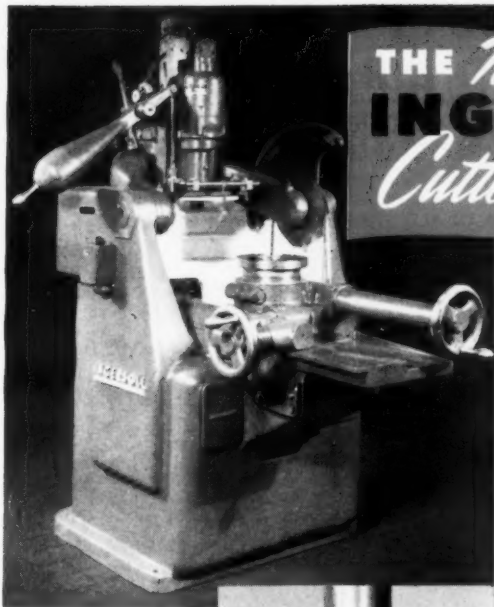
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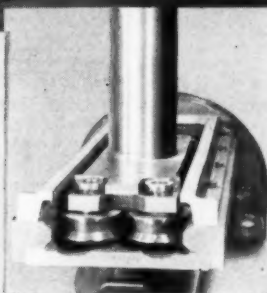
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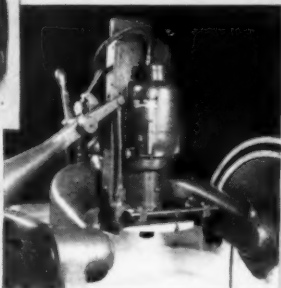


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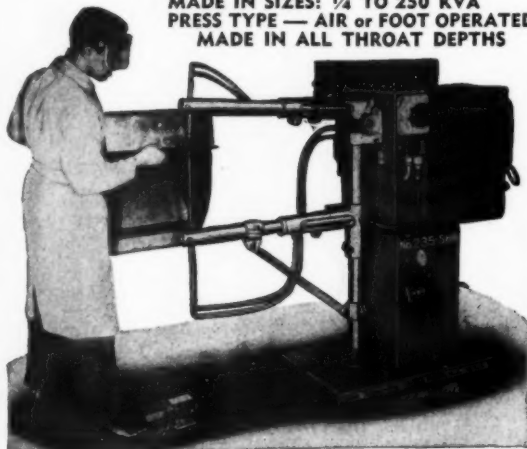


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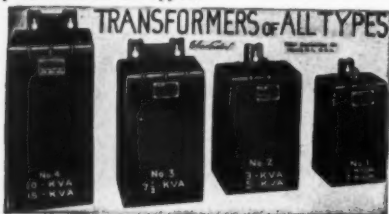
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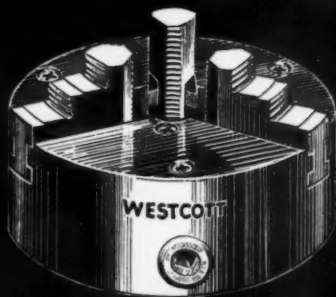
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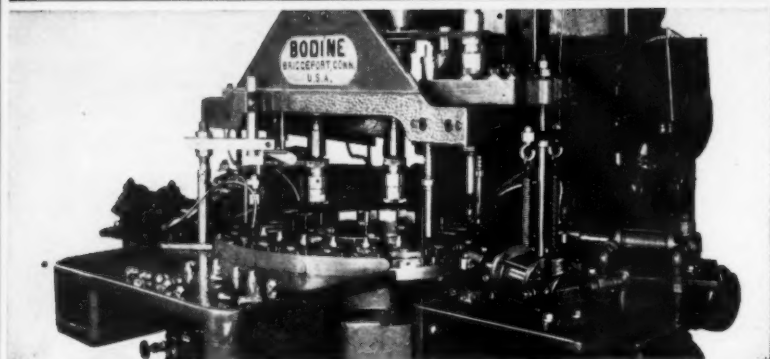
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# A Round Table Discussion

ON SMALL PARTS PRODUCTION.....

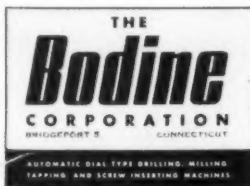


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# Featured in this issue . . . . .

**SALIENT FEATURES OF HANDWHEEL DESIGN**, by H. F. Williams. Concludes discussion of various shaped rims from Part I and continues with shapes and number of spokes and the subject of balanced handwheels. Spokes may possess square sides causing little trouble to a pattern maker, they may form a cross, being higher than wide, or a third side may be added. Handwheels may own any number of spokes—designing engineers follow no conventional lines today—, and may be counterbalanced in three ways. Page....169.

**CAMS, THEIR PRODUCTION AND APPLICATION**, by John E. Hyler. Part 2 of a series. The particular equipment that chances to be on the shop floor for other purposes influences the choice of a cam cutting method, as has the question of the volume of cams to be produced. The author here considers machining methods for peripheral cams other than uniform rise cams. Page.....143.

**GENERATING REGULAR AND IRREGULAR HOLES WITH A GEAR SHAPER**, by Douglas T. Hamilton. Applications of "off-set" generating to different-shaped holes and machining by "conjugate" generating, using cutters differing in shape from that of the hole produced. "Off-set" generating can also be applied to external surfaces under the same conditions as for internal surfaces. Page 155.

**WHAT TYPE OF FLUID POWER SHALL I USE?** by Harry L. Stewart. Fluid power saves time, effort and motion, reduces maintenance costs and provides flexibility in equipment without complex mechanisms. The ingenuity of the designer or engineer is the only factor limiting applications of the principle originally evolved by a French scientist in the 17th century. Air and hydraulic devices are finding new uses in plants all over

the country, regardless of the size of the plant. Page.....133

**THE FOREMANSHIP FORUM**, by Edmund Mottershead. Essentials of Good Foreman Training Program. Four elements for companies to check before embarking on a foremanship training program: Incentive to the foreman to learn and use new skills, definite objectives expected of the department, a written program in writing and a method of checking progress regularly. Page.....189

**LETTER FROM ENGLAND**. Page.....201

**ADVANCE SPACE SALE AUGURS SUCCESS OF ASTE EXPOSITION IN CLEVELAND**. Page .....205

**NEWS OF THE INDUSTRY**. Page.....205

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**THIS MONTH'S INDUSTRIAL FILMS**. Page.....221

**TUMBLING BARRELS DEMONSTRATE VERSATILITY**, by John E. Hyler. Page 227

**SHOP HINTS**. Page.....227

**HOW TO SET UP VISUAL CONTROL BOARD**, by John A. Howland. Page.....228

**NEW TECHNICAL BOOKS**. Page.....230

**WHAT'S NEW IN METALWORKING**. Page.....233

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# SAVE 3 WAYS

## ON SMALL PARTS MILLING

YOU have them every day — small parts milling jobs that take a chunk out of profits when handled on unnecessarily large machines. Most of them are jobs that can be turned out faster and more efficiently on an Atlas miller.

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# As the Editor ... SEES IT ...

## FOR ENGINEERS: A BETTER BALANCED EDUCATIONAL PROGRAM

Today's engineer is requested to address conventions, sales meetings and clubs in non-technical language. He travels with salesmen, braving the bitter wind of merchandising; he bandies words with the technical press.

Today's engineer must write in straightforward English. Reports, bulletins, publicity material and papers are sweated out in collaboration with advertising and publicity counsels. He is selected to prepare trade paper articles, thus launching a new product, describing a phase of research or analyzing a production technique.

The conference table is not immune to the engineer's intelligence. He is invited to participate in such non-technical discussions as labor management, public and community relations. His awareness of the interrelation between production prices, wages, sales and competition must be active and intelligent.

Yes, indeed, the modern engineer is more than an engineer. To the spicy mixture of formulae and technical tables is added the heady wine of pen and word and counsel. Unfortunately, too many engineers speak haltingly, write hesitantly and opinionate in silence. It is quite natural that this should be so. He was trained to be an engineer, not a lecturer, writer or counsellor. He knows his craft and discharges his duties with imagination, intelligence and skill; America's technical growth in

the last 50 years is vociferous evidence.

Because some of our schools are negligent in teaching down-to-earth non-engineering subjects, the engineer is left to his own devices to pick up, as best he may, the fundamentals of writing, speaking, selling and counselling. Assuming the engineer to be anxious to improve himself, a suggestion is advanced which might help the engineer to more efficiently discharge his newly-acquired duties.

Why don't the various engineering societies, working nationally through local chapters organize classes or lecture courses at which practical writing, speaking, selling, publicity and advertising are expounded in terms of the engineer's participation? When sponsored by engineering societies an educational program need not have a commercial aspect. Editors, salesmen, advertising men, publicists and others could be recruited to lecture and instruct.

All lectures would be practical, being presented by men conversant with the engineer's problems. Ideas discussed would be of immediate value. Here will be no dry-as-dust theories, abstract discussions and tortuous principles; instead, hard hitting facts.

Conference halls of local chapters, meeting rooms of some of the larger manufacturers could be enlisted. The cost of such a program would be slight; the value to engineers immense.

*William F. Schleicher*

## A BUYING GUIDE FOR ABRASIVES

### ABRASIVE PROBLEM:

Is there anything **NEW**  
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ANSWER BY

**CARBORUNDUM**

TRADE MARK



The Carborundum Company has developed an entirely new and more convenient method of packaging coated abrasives. Based on a careful analysis of requirements and problems of both users and distributors it facilitates use, handling, shipping and stocking of coated abrasives.

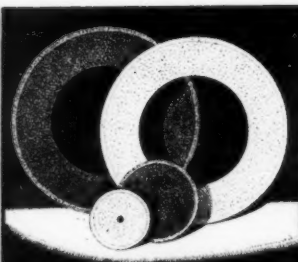
Under this new system, sturdy packages contain "decimal" quantities of 25, 50 or 100 sheets. Cartons replace paper wrappings. Standard units are emphasized. Products are clearly identified by their end-use name on labels and backing. Ordering is expedited. Pricing and inventory are simplified. Handling is easier. Cardboard sleeves protect against curling and tearing.

This interest in the problems of our customers is amply repaid in the increasing preference for products by **CARBORUNDUM**. The Carborundum Company, Niagara Falls, New York.

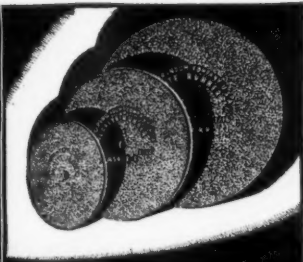


**CARBORUNDUM** IS A REGISTERED TRADEMARK WHICH INDICATES  
MANUFACTURE BY THE CARBORUNDUM COMPANY

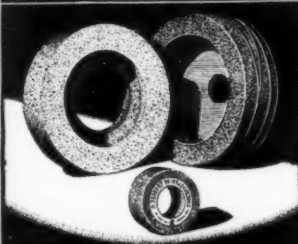
**A Good Rule for Good Grinding**



Specialized wheels by CARBORUNDUM  
for thread grinding.



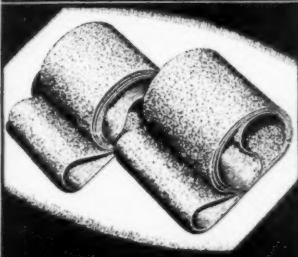
Cutting-off wheels... the modern tool  
for faster, less costly, more finished cuts.



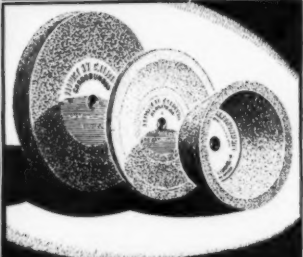
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Diamond wheels to meet stiffer  
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port with every shipment. The report covers: Chemical analysis, result of end-quench hardenability tests, mechanical properties, as interpreted from the test results, and recommended working temperatures for every heat of alloy steel in the shipment.

Hardenability is nothing new with Ryerson. It's been a Ryerson service for ten years now—part of a system designed to assist your buying and assure the correct application of all alloy steels. Take advantage of this *complete* service and contact Ryerson for prompt shipment of all alloy needs.

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# RYERSON STEEL



## WHAT TYPE OF FLUID POWER. 9

*Shall  
Use?*

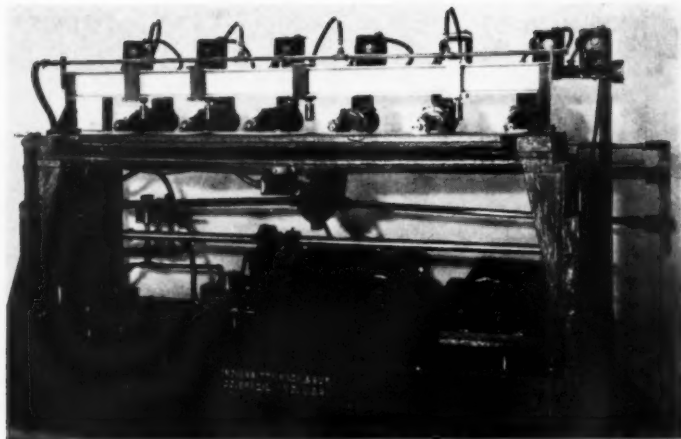
by Harry L. Stewart

Logansport Machine Co., Inc.

Hydraulic, airdraulic and air power has many applications in industry, assisting management in its battle against time and costs. Some of these applications are mentioned in this article. Principles governing the selection of a specific type of fluid power to meet a given service requirement are discussed.

**W**HETHER DESIGNING new equipment or re-converting an old machine, the use of fluid power can benefit in three different ways: 1. It will save time, effort and motion; 2. Reduce maintenance costs; 3. Provide flexibility in equipment without complex mechanisms.

The basic principle of fluid power is not a new one. In the year 1658 a French Scientist, Blaise Pascal, evolved the basic law for science of hydraulics. This law states that "the pressure exerted anywhere upon an enclosed liquid is transmitted undiminished in all directions to the interior of the container." The application of that principle is limited only by the ingenuity of the designer or engineer. If there exists an application pertaining to lifting, tilting, clamping, pushing, pulling, forcing, or other straight line motions, it is likely that the use of fluid power will meet the requirements. Many rotary motions are also solved by the use of fluid power. It is difficult to visualize the tremendous part that fluid power is playing in manufacturing, mining, agriculture and transportation. From our huge industries where mass production is a must, to the small shops where higher efficiency is necessary for survival we are finding



1. This woodworking machine utilizes small air cylinders for hold down devices, an air-draulic cylinder for operating the speed of the table which moves into the cutters, and air operated solenoid valves, along with the auxiliary equipment. The air-draulic cylinder feeds the work slowly into the cutters at a predetermined speed and also provides a rapid return stroke without unnecessary cam and linkage motion.

• • •

new applications for the use of air and hydraulic devices.

There are a number of different kinds of fluid power; hydraulic, airdraulic and air power, and it is sometimes a difficult task to determine which kind will perform a given operation quickest and most economically. While there is no hard and fast rule to follow, a general rule is as follows:

If equipment requires a large amount of pressure or an extremely accurate feed, use hydraulic power; if the application requires only a medium amount of pressure or a good accurate feed, use airdraulic; if the application requires speed, a medium amount of pressure and only fairly accurate feed, use air power.

Of course there are other things to take into consideration when selecting

the correct medium for the installation.

1. Whether or not the compressors available are large enough to handle added equipment.

2. Which set of fluid power equipment will best work into the scheme of your product. This will be determined by space, number of cycles of operation per day, location of equipment, etc.

3. Cost of complete installation.

The present day trend is to eliminate central power stations whenever possible. A good example of this, although not in the line with fluid power, is the obsolescence of overhead line shafts. Twenty years ago in visiting manufacturing plants one would find an overhead line shaft running from one end of the plant to the other and operating this shaft would be one large elec-

tric motor which in turn operated all of the machines along the line. If the motor would fail, all of the machines would be shut down. With the necessity of increased production, the elimination of line shafts is almost universal. The trend is toward the "packaged unit" as much as possible.

Fluid power circuits may be divided into two general classifications, direct control and remote control. In analyzing the various components which make up the air, airhydraulic or oil hydraulic fluid power circuit, we can divide these components into four parts:

**1. The Power Unit:** In the air and airhydraulic system the power obtained from air compressors which in all probability will serve the entire shop, while in the oil hydraulic system the power is obtained from a compact "packaged unit" which usually only serves one machine or one group of machines. The oil hydraulic power unit consists of an oil reservoir, hydraulic pump, electric motor, relief valve, motor coupling, pressure gauge, oil strainer and necessary internal piping. The oil reservoir must be large enough to allow sufficient cooling of the oil on its return from

the circuit. In order to insure satisfactory performance it is necessary to use a good hydraulic oil and make sure the reservoir is drained, cleaned and filled with new oil at regular intervals.

**2. Operating Valves:** The operating valves play a very important part in the action and function of the circuit. The valves which find the most use in working out the various circuits are as follows:

**A. Four-way control valves:** These valves which may be operated manually, electrically, by pressure, or by bleeder means are composed of four parts: two cylinder ports, an intake port and an exhaust port.

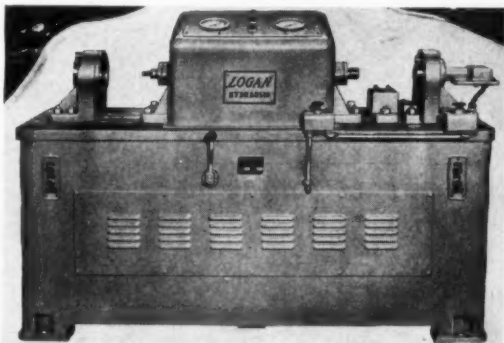
**B. Three-way control valves:** These valves are similar to the four-way valves except they have only three ports, a cylinder port, intake port and exhaust port. Three-way valves find the wide application in conjunction with the operation of four-way valves in remote control circuits and also in the operation of single acting cylinders.

**C. Speed control valves:** Speed control valves are used to control the volume of fluid which is allowed to pass through an adjustable orifice

• • •

**2. This is an assembly and gauging machine for assembling and dis-assembling impellers on spline shafts for superchargers. Visible in the center of the machine are the lights which light up depending on whatever fit is accomplished in the pressing movement.**

• • •



which in turn controls the speed of operation of the operating cylinders. Most speed control valves are equipped with a check valve in order to allow a free flow of fluid in the reverse direction from the metering action.

**D. Sequence valves:** Sequence valves govern the sequence of operation of different parts of the circuit. These valves are spring loaded so that a certain pressure must be reached before the valves will open.

**E. Relief and reducing valves:** These valves regulate the fluid pressure in the circuits and smoothes out surges.

**3. Lines In Which the Fluid Power Flows:** The lines in each of the fluid power systems guide the medium through the circuit. For peak efficiency in the circuit it is necessary that lines be of sufficient size to carry the medium with the least possible friction. The lines must be free of dirt, scale or leaks. Dirty lines will cause extensive damage

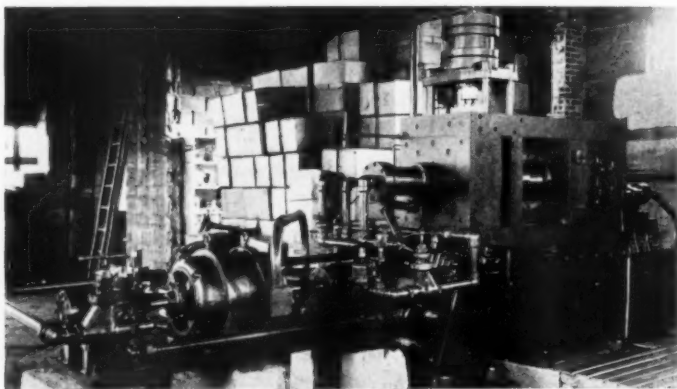
to the intricate operating mechanisms of the various components while leaks cause loss of power and efficiency. The lines must be as short as possible and free from any sharp bends.

**4. Fluid Motors Where the Power is Expended:** In our case the fluid motors are the operating cylinders. The cylinders for the various systems are as follows:

**A. For the air system:** single and double acting air cylinders in both rotating and non-rotating types. Rotating air cylinders for operating power chucks are of several designs:

1. Cast iron bodies and ball bearing type air-shaft for low spindle speeds.
2. Aluminum bodies and ball bearing type air-shaft for high spindle speeds.
3. Hollow air-shaft for feeding bar stock through center. In choosing the proper air-shaft design for rotating hollow center cylinders it is suggested the fol-

• • •  
**3. A die casting machine equipped with hydraulic valves, cylinders and power unit. The unit is equipped with Vickers pumps.**



lowing recommendations, which are based on air-shaft diameter of 1" larger than the size of the hole through center, be followed:

- a. 1000 surface feet per minute-water cooled ball bearing.
- b. 400 surface feet per minute-ball bearing.
- c. 250 surface feet per minute-sleeve bearing.

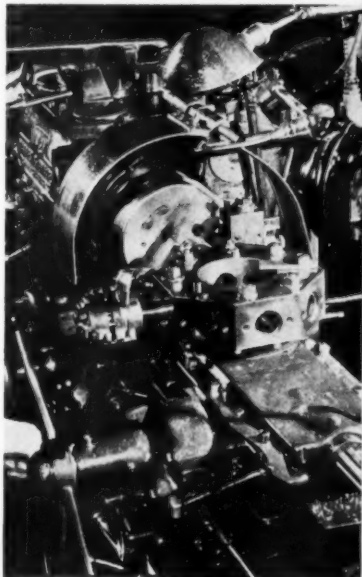
B. For the air-hydraulic system: double acting air-hydraulic cylinder which is powered by air but has an oil control.

C. For the oil-hydraulic system: double and single acting hydraulic cylinders in both rotating and non-rotating types. Standard non-rotating cylinders have been constructed for several thousand psi working pressure. Two outstanding developments in hydraulic cylinder construction have been the introduction of "O" rings for cover seals and the use of centrifugal cast iron for cylinder tubes.

Numerous case histories may be given as examples of the many advantages of fluid power. A few examples are:

1. Air Chucking Equipment: The use of air chucking equipment on production lathes is becoming more prevalent as management tries to cope with increased costs. One manufacturer made a comparison between air and power chucking equipment. He used round pieces light enough to be lifted by hand into the chuck and found the ratio of chucking time between manual operation was four to one. This does not take into account operator fatigue.

It must be realized that it is not an easy task to chuck large pieces by hand. With the use of carbide tipped tools and other high grade cutting tools which can really bite into the work, it is necessary that the chucks have a firm grip on the work. In talking to

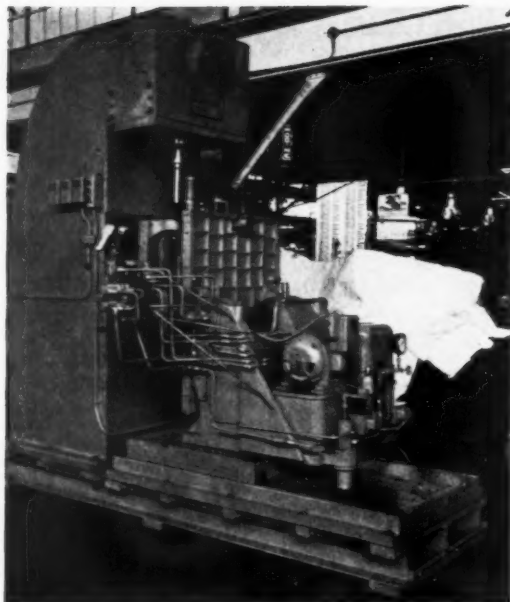


4. Chucking equipment in action. They are using Logan cylinder, chuck, hand valve and lubricating unit.

• • •

foremen and time-study men it was found that operators on machines with hand chucking equipment experience greater operator fatigue and loss of efficiency than those on like machines with power chucking equipment. Management in many plants are reconverting to power chucking equipment wherever practical.

2. Special Hydraulic Machinery: Many special hydraulic machines are being devised to meet the needs of industry. For instance, a large manufacturer solved a problem by the use of a special horizontal hydraulic press, the application was to press an impeller onto spline shaft so it had the correct



**5. A crank shaft riveting machine completely hydraulic. One power unit is mounted on the carriage of the machine. This is a 50-ton press with a special carriage built into it.**

• • •

press fit. Due to their range in tolerances they got three results; the press fits were either too tight, too loose, or satisfactory. It was difficult to pick out the defective assemblies and their production ran into a bottleneck. A press was devised that left nothing to the judgment of the operator. On the face of this press were three lights: red, amber and green. During the pressing operation if the red light turned on, the press fit was too tight; if the amber light turned on, the press fit was too

loose; and if the green light turned on, the press fit was correct. The operator needed only to watch the lights and pick out the correct assemblies. The rejects were placed on a disassembly fixture on the rear of the press and the spline shaft was pressed from the impeller.

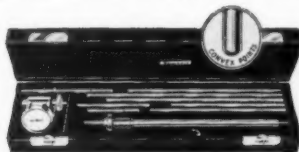
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being controlled by hydraulic feeds are the most common combinations. For example, a manufacturer of high production wood working equipment found that he needed a set-up whereby the work table would approach the cutters at a rapid rate, feed the work through the cutters, then return rapidly. It was also necessary to have various feed rates, depending on the hardness of the wood being fed through the cutters. This set-up was easily accomplished by the use of an air-hydraulic cylinder and the proper valves.

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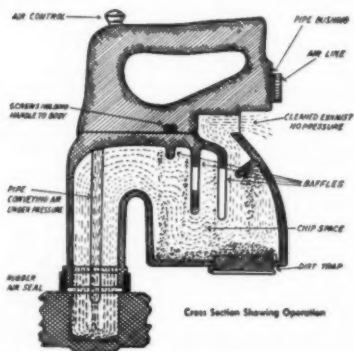
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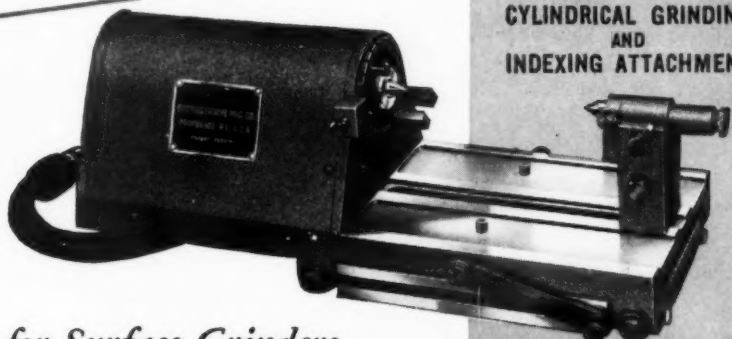
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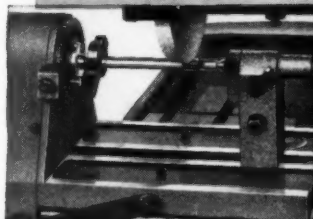


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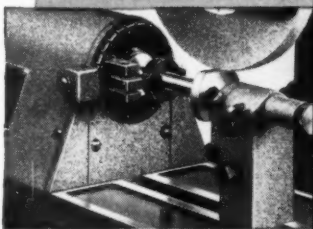
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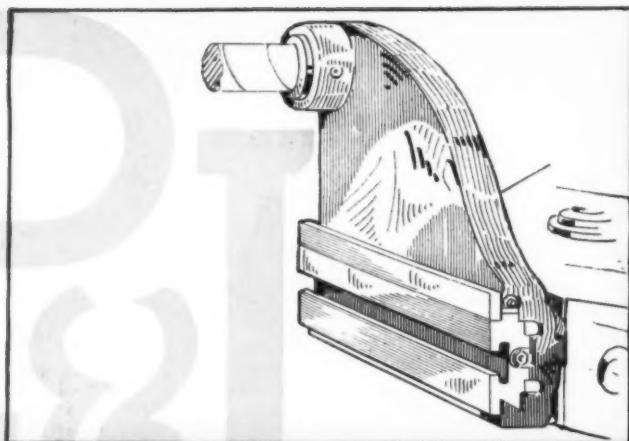
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# Cams . . . . .

## THEIR PRODUCTION AND APPLICATION

By John E. Hyler



Contour sawing machines are used effectively to make peripheral cams. Horizontal milling machines, with special cam milling attachments, are frequently employed. Gear shapers are versatile enough to generate many kinds of peripheral cams.

**T**HE PRECEDING article, insofar as it dealt with peripheral cams, had production of uniform-rise cams chiefly in view. Uniform-rise cams, while absolutely necessary in many cases, and while they are often very convenient to produce by some of the methods cited, are practical only on cam-actuated mechanisms provided with a slow movement, and they are far from being the complete picture even in the slow-motion field. When we come to the proposition of making peripheral cams other than the uniform-rise type, machining methods formerly considered are useless. Variable rise cams are produced by various methods other than the ones already cited. On the other hand, while methods already referred to cannot be employed for making variable-rise cams, it is usually the case that a method employed for making variable-rise cams can be employed for making these with a uniform-rise, if it appears expedient in any given plant. Quite often, the particular equipment that chances to be on the shop floor for other purposes has something to do with the choice of a cam cutting method. The volume in which given types of cams must be produced also has a definite bearing.

The contour-sawing machines of bandsaw type that



Fig. 1. It is not at all difficult to cut out cams of peripheral type on a contour sawing machine. A 5/16" — 10-pitch saw blade is being run at a velocity of 125 feet per minute. The cutting is clean and requires very little finishing; however, in cases where such cams do need smoothing or touching up, it can be readily and quickly done on a band filing machine. Each of the cams shown in this illustration were sawed out in approximately 25 minutes.

• • •

machine cams, have been cut in this manner to advantage, and when it comes to making one or two single and special cams, it is difficult, if not impossible, to find any other method that will compare with this one. An illustration is included showing a machine of this type engaged in cutting cams on a production basis. Continuous filing machines can be and sometimes are used for smoothing bandsaw cams. See figure 1.

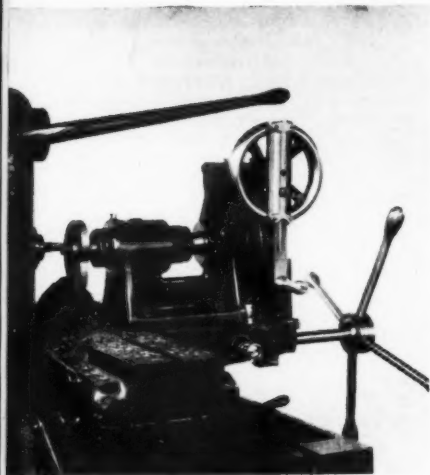
have entered the metal-working field, have been employed for cutting out cams in many instances. In using such a machine, the cam lines are laid out on the surface of the stock to be cut, and one simply saws to the line by eye. However, a magnifying glass is often used, through which the operator views the progress of the work. This glass magnifies the work, at the point of cutting, about three times. At any points in the work where sharp internal corners occur, holes are pre-drilled, closely adjacent to the internal corner, before bandsawing begins, making it easy to turn the bandsaw blade in the hole, and to clean out the corners with a minimum of work and time expended.

Using the proper blade and speed, the cut is very clean, requiring but little finishing, and a good operator can easily stay within .010" of the line, without a magnifying glass. If the glass is used, the maximum error will be only about one-third of this amount. All kinds of peripheral cams, including screw

#### Horizontal Millers Can Be Used

Apart from the cutting of uniform-rise cams with a vertical milling attachment and a spiral index head on the universal miller, as outlined in the previous article, it is entirely practical to mill other types of cams at a horizontal milling machine, by means of a special attachment which makes use of a special cam former. In fact, one leading manufacturer of horizontal millers formerly provided a cam milling attachment of this kind, as a standard item. While this type of attachment is no longer available as a stock item, it can doubtless be obtained on special order, and an ingenious mechanic could make something similar in any plant where it seemed advantageous.

The attachment is made with a head that can be bolted to the milling machine table either at right angles to the table, or parallel to it. The attachment may be used for milling peripheral cam contours, or it may be em-



ployed for milling required cam grooves in cylindrical cams. When used for peripheral cams, the attachment head is set at right angles to the milling machine table, and the cam is held to the attachment spindle by means of a bolt. When used for milling grooves in cylindrical cams, the attachment head is set parallel with the milling machine table, and a tailstock is used in connection, so the cam being milled can be held between centers.

In using an attachment of this kind, the milling machine table has no motion, but remains clamped in one position while milling is in process. The necessary movement of the cam is provided for within the attachment itself. The cam is turned to engage the milling cutter by means of a handwheel in most cases, the handwheel being mounted at the end of a worm, and the worm turning a worm-wheel, which is mounted on the work-holding or work-turning spindle. In order to obtain the advancing and receding movements necessary on the work, a previously-

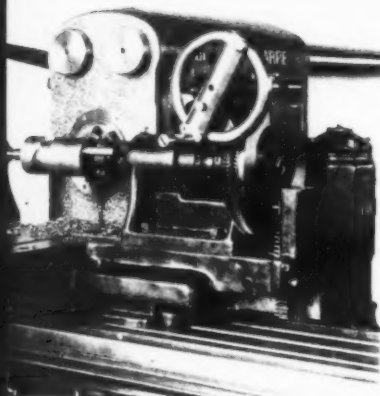
Fig. 2. A peripheral cam in process of being milled, using a cam milling attachment. Here, the cam is held to the end of the spindle with a bolt. The rotative motion is obtained through the hand-advancing, and retractive movements are obtained through a cam former (which cannot be seen in this view) attached to the face of the wormwheel. A positive-action or so-called face cam would be milled in the manner here shown, as well.

• • •

made former is attached to the face of the worm-wheel. This former is arranged to depress a vertically-sliding rack. This rack, as depressed by the former, actuates a pinion. The pinion, in turn, engages a second rack, that is integral with the sliding bed of the attachment, thus providing the necessary longitudinal advancing and retracting motions to generate the required peripheral cam contour, or the required lead in the cylindrical cam groove, as the case may be. See figures 2, 2A, 2B.

#### Use of Gear Shapers

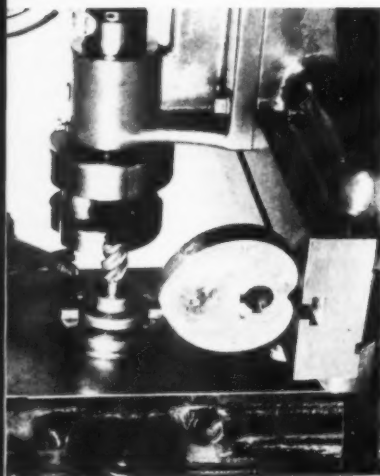
It certainly must not be overlooked that the gear shaper is highly convenient for cutting many different types of peripheral cams. Because it has its cutting stroke short, and in parallelism with the axis of the work-holding spindle, it can be and has been used for cutting very special cluster cams on integral sleeves, and like work that would be very difficult to handle by any other means. For the benefit of any who may not be acquainted with the operating principle of the gear shaper, it may be said that it has a cutter spindle which reciprocates vertically, (except in a few instances where a special gear shaper has a horizontal cutter spindle, or where it is set at an angle for generating taper into the work being handled) and it has a work-mounting spindle which is also vertical. The cutter spindle is mounted on a sad-



**Fig. 2A.** Milling a groove in a cylindrical cam. The axial-transverse values for the groove are incorporated into the former, attached to faceplate on right of worm wheel. Actuation is through the handwheel. The table has no movement, but must be set at a height that will bring the axial line of fixture centers the same height as the axis of the milling machine spindle.

the machine is being used for shaping gears, or for other work. There are almost countless other types of work than gears that can be handled to advantage on such machines, but we naturally limit ourselves here to a consideration of peripheral cams.

Peripheral cams are generated on the gear shaper by either one of two methods. One of these consists of using what is known as a "conjugate" cutter. This cutter must either be arranged to rotate once while the cam being

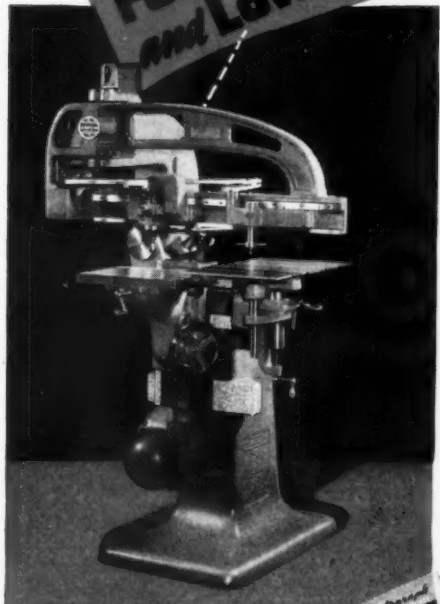


**Fig. 2B.** Here is an instance in which a heart-shaped cam incorporating considerable throw is being milled with an attachment, illustrating how cams with large throw are often machined when rotating on a center other than the one they will rotate on when in actual use. You will observe that a special holder has been arranged on the end of the attachment spindle to hold this cam while it is being milled. The holder has an offset stud to receive the cam, and the offset is a proper amount to being the milling center of rotation quite close to the center of the cam area, thus greatly reducing the advancing and retracting motions it is necessary to give the cam, toward and from the cutter, while it is being milled.

die, which can be made to approach the work spindle, or be retracted from it, as the cutting proceeds. The cutter spindle and the work spindle are both rotated as cutting progresses. Therefore, it is a generating process, whether

machined rotates once, or it must be arranged to rotate a given number of times, exactly, while the work makes exactly one revolution. The latter method is employed in cases where the same rises and contours repeat on the periphery of a single cam, as for instance on valve operating cams for

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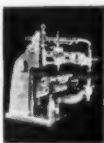
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rotary airplane engines. See figure 3.

In speaking of a "conjugate" cutter, we mean a cutter designed and made with such a contour, that when it is revolved in right cutting relationship to the cam being machined, it will produce the required cam profile, while the axial lines of the work spindle and the cutter spindle, respectively, remain a constant distance apart. It is highly interesting to observe the relative forms such cutters take, but we cannot enter into this particularly here, except to say that conjugate cutters are used for machining all kinds of regular and irregular forms at the gear shaper, and are therefore applicable to the cutting of cams.\*

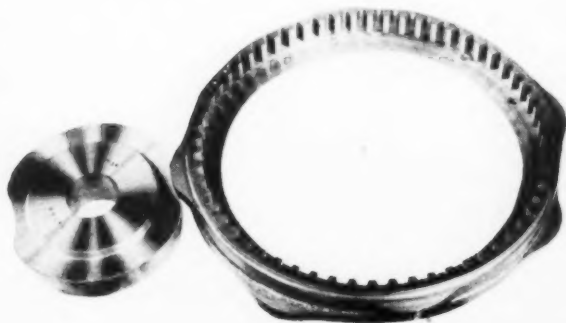
Because of its short working stroke,

*\*For a further discussion of gear shapers and conjugate and off-set generating, see the article, **Generating Regular and Irregular Holes With a Gear Shaper, appearing elsewhere in this issue.***

made parallel to the axis of the work-holding spindle, the gear shaper can readily machine many types of work involving cam generation, which are difficult to handle otherwise. We think especially of cases where special cam parts incorporate more than one cam, revolving around the same axis. There are various instances where such an arrangement is highly advantageous in machine design. Consider a hollow-bored part, of relatively large rough diameter before turning, then turned in such fashion as to leave two or more generous-diameter annular members standing, spaced quite close together, while the remainder of the part is turned down until it takes the form of a sleeve, with the annular members integral. Such a part can be taken to the gear shaper, and the two or more cam members separately machined, either with different cam outlines, or with the same contour at different angular locations. The fact is that we have noted the production of one such

• • •

**Fig. 3.** Shown is a valve operating cam for an airplane engine, together with the conjugate cutter used for generating it on the gear shaper. Observe that the internal gear which drives the cam is integral, being cut in the same blank.





Subject: FILES FOR STAINLESS STEEL

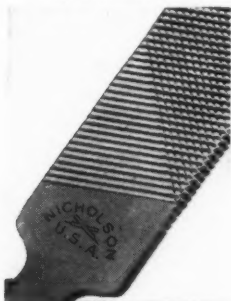
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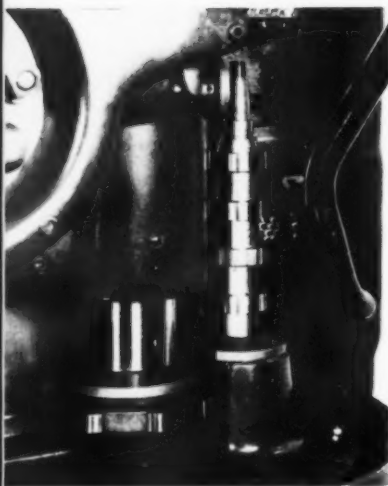
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**Fig. 4.** Here a gear shaper is equipped with a work-elevating and lowering mechanism, and a special six-lobed cutter, for generating six cams on a camshaft for a Diesel engine fuel injection pump. The camshaft is in place in the special work holder. Shown also is a close-up view of the cutter.

#### **Gear Shapers with Special Feed Cams**

The other method employed for generating peripheral cams at the gear shaper is through the use of a special feed cam on the machine itself, to advance and/or retract the cutter spindle progressively, so that a simple cutter will generate the required cam outline. As a case in point, it would be possible to use a single-point cutter on the cutter spindle, without any cutter rotation, and by using a feed cam that will provide uniform transversal of the cutter spindle, while the work spindle revolves, to produce a constant-rise cam. However, the method actually employed is to use a circular cutter, with a radius smaller than that of any internal curve to be produced on the cam, and allow it to revolve as the cutting proceeds. The production of cams in this manner at the gear shaper, allows the same cutter to be used for generating many different forms.

composite part, having seven annular members left standing when turned, all seven of which were subsequently machined at the gear shaper, four of the seven being cams. There is a special gear at one end of this part, two special gears at the other end, and the four peripheral cams in between, no two of these cams having the same contour. Special facilities, in the nature of flats milled on the cutters, and aligning gages clamped to the work-holding fixture, are employed for aligning the work properly, with reference to each cutter, as the different machine setups succeed one another. It has been possible, on this job, to position the various cams and gear teeth to the close limit of .001 inch for alignment, and all radii on the cams are held to the same close accuracy. While jobs of this kind are definitely the exception, it is interesting to know they can be machined to high advantage at the gear shaper. Conjugate cutters were used all the way through on this job.

Since a gear shaper can be employed for generating internal as well as external contours, the production of internal cams is entirely possible. The same choice of method, as to whether one will employ conjugate cutters or a special feed cam, is at hand where internal cams are being produced, as well as external. One thing may be especially noted with regard to gear-shaper production of cams having a very large throw. Instead of mounting these with the same center of rotation they will have on the mechanism in which they will be used, they are often mounted so the cutting center of rotation is quite close to the actual center of cam area. This simplifies the mak-

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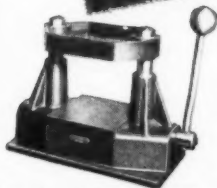
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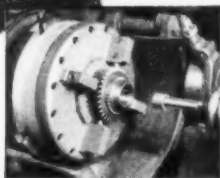
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ing of a conjugate cutter, or, when the freed cam method is used, it allows employing a feed cam with a much smaller throw.

One would usually not think of generating cam profiles on a number of cams on the same camshaft, at the gear shaper, but it has been done to good advantage. We do not know of any instances where long camshafts, such as those used for automotive valve operation, are handled in this way, but figure 4 shows six individual cams being generated, on the camshaft for a fuel injection pump for a Diesel engine. All six cams are machined with the same cutter, the gear shaper in this case being equipped with an ingenious automatic work-elevating and work-lowering mechanism. The work-spindle is provided with a sleeve, and the camshaft is attached to this sleeve. The camshaft is loaded with the sleeve-type work-holder in the upper position, so that the lowest cam is cut first. A special torque motor is used, for moving the work from one position to the other, and one rotation of the cutter machines all six cams.

When the starting button is depressed, the torque motor automatically lowers the work into position for cutting the first cam, and the cutting is then pro-

gressive until all six cams have been machined in proper order. The six cams on this shaft are spaced 60 degrees apart, but the spacing is not in consecutive order. Because the cams are not in consecutive order as to spacing, the six cutting lobes on the cutter cannot be and are not equally spaced, angularly. The cutter is therefore made of sufficient diameter to make possible the natural positional spacing of the cutting lobes, with regard to relational rotation between the cutter spindle and work spindle. This actually works out so that three of the cutting lobes are spaced quite closely together while the other three are quite far apart.

It happens that the cams on this shaft must also be cut in a definite relationship to a keyway. Special gaging facilities are provided, by means of which this relationship may be closely held. It might be wished that space were available for considering this setup more fully, but we must content ourselves merely with noting that the gear shaper greatly reduced the time needed for processing these camshafts, as against a different method formerly employed. (END OF PART TWO)

(Photos through courtesy. Brown & Sharpe Mfg. Co., The Fellows Gear Shaper Co., The Do-All Co.)

#### **ARMY AND AIR FORCE NEED 30,000 MEN A MONTH**

One of the most serious problems facing the U. S. Army and U. S. Air Force today is the continuing need for manpower to man occupation areas, to train for national defense, and to maintain a long range research and development program.

To accomplish its worldwide assignments, the Army and Air Force combined must have a steady flow of 30,000 volunteers a month—21,000 for the Army and 9,000 for the Air Force. Since not more than three out of every five potential recruits can measure up to the new high standards for Army and Air Force service, the actual monthly requirement is 50,000 applicants for enlistment.

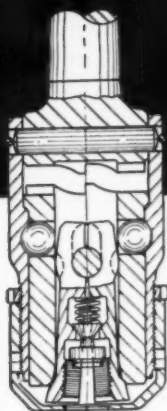
The Army and Air Force offer un-

usual opportunities for interesting careers or training for future civilian jobs. New regulations permit men enlisting for three years to choose in advance their own fields of specialist training in service schools. Pay is high. Retirement benefits are unmatched. Medical and dental care, food, lodging and clothing are free. Each recruit is entitled to 30 days' vacation a year and frequent passes. Enlisted men in the Regular Army have new opportunities for promotion by qualifying for the Potential Leaders' Schools. Enlisted men in both the Army and Air Force are eligible to compete for Officer Candidate Schools. More than 5,000 Aviation Cadets will be needed in the year beginning March 1, 1948 for training as pilots. Graduates are commissioned in the U. S. Air Force Reserve and assigned to active flying duty for three years.

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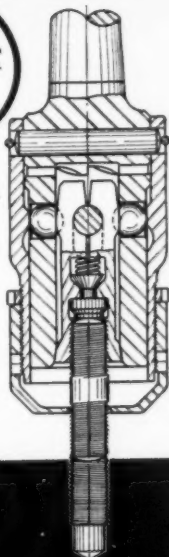
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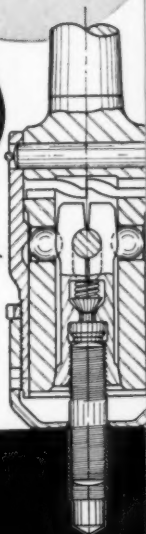


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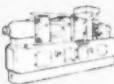
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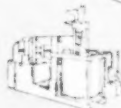


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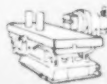
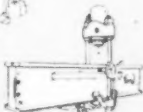
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# GENERATING REGULAR AND IRREGULAR HOLES *with a Gear Shaper*



by Douglas T. Hamilton  
The Fellows Gear Shaper Co.

Round, three-lobed, square, hexagonal, octagonal and rectangular holes can easily be generated with a gear shaper. Offset and conjugate generating are the methods used to finish these irregular and regular holes.

**T**HE FINISHING of regular and irregular-shaped holes such as the square and hexagon bolt and nut trim dies shown in figure 1, can be successfully accomplished on The Fellows Gear Shaper, as shown in figure 2, by using a method known as "off-set" generating"; or a combination of off-set and "conjugate" generating. The term "off-set" is used when the generating cutter and work are of the same general shape; when one member—cutter or work—is external and the other internal; and when both members rotate at a 1 to 1 ratio. The following examples illustrate applications of "off-set" generating to different-shaped holes, and also show how these same holes can be machined by "conjugate" generating, using cutters differing in shape from that of the hole produced. "Off-set" generating can also be applied to external surfaces under the same conditions as for internal surfaces.

**Generating a Round Hole.** The basic principle employed can be illustrated by the generating of a round hole, as shown in figure 3, where a plain circular cutter is employed. The diameter of the hole produced, of course, is governed by the amount of "off-set" of the cutter and work centers. Both work and cutter



Fig. 1. Collection of square and hexagon nut and bolt trim dies, and gear cutters used in producing them.

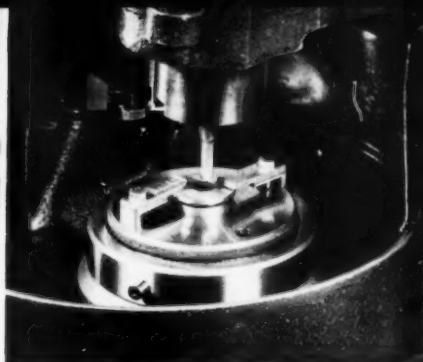


Fig. 2. Close view of Fellows 7-type gear shaper generating hexagon nut and bolt trim dies.

are rotated in the same direction, and at a 1 to 1 ratio, one revolution of cutter and work completing the hole. The cutter, of course, is reciprocated, as work and cutter rotate in harmony with each other. It will, of course, be obvious that any desired tolerance on hole size can be maintained by changing the amount of "off-set" of the cutter, and that resharpening of the cutter can be compensated for by changing the amount of "off-set."

#### Generating a Three-lobed Hole.

At A, B, and C, figure 4, a three-lobed splined hole is being generated by a three-lobed cutter by a combination of "off-set" and "Conjugate" generating. At A, the cutter is shown centered with the round hole in the work. At B, the cutter has been fed into depth, and to the desired "off-set" to produce the size of hole desired. At C, cutter and work have both made one revolution, and the hole is completed. The same conditions apply here as in the previous case, in that the size of the hole can be controlled by changing the "off-set" position of the

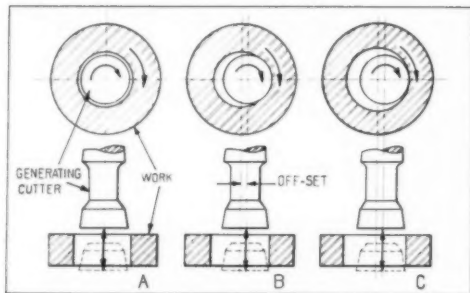


Fig. 3. "Off-set" generating a round hole.

cutter relative to the work.

At D, E and F, in figure 4, is shown another application of this principle to the generating of a three-lobed splined hole in change gears. In this case a "twin" cutter is employed. The hole is roughed to approximate size by the lower cutter, as shown at D and E, and a finishing cut taken with the upper cutter, as shown at F. The Gear Shaper is equipped with an elevating type fixture, as shown in figure



# Actual Gear Shaving Production Figures

As a gear manufacturer, you are familiar with the gear shaving process to correct index, helical angle, tooth profile, eccentricity and objectionable surface roughness.

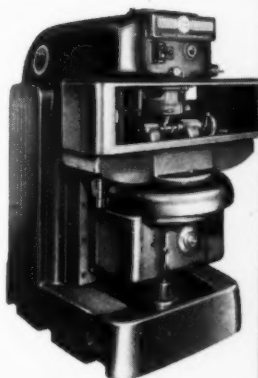
You may not know how much the new Red Ring *DIAGONAL* Gear Shaver has contributed to the speed and economy of this process. Just look over these actual production figures which are typical.



Gear	Material	Dia.	Face	Teeth	DP	Stock Removed over Pins	Machine Time
1	Steel	4"	1 1/16"	29	9.25	.010"	30 seconds
2	Steel	3 5/16"	1"	23	10.5	.010"	23 seconds
3	Cast Iron	2 5/16"	1 1/16"	28	10	.010"	20 seconds
4	Steel	2 1/4"	1 3/8"	14	7.6	.009"	28 seconds
5	Steel	1 1/8"	1"	12	13.5	.005"	9 seconds
6	Steel	2 3/16"	1 1/16"	14	6/8	.006"	15 seconds
7	Aluminum	6 1/2"	1"	56	10	.010"	25 seconds



For further information write for Bulletin S47-3 or, better still, consult a Red Ring Engineer.



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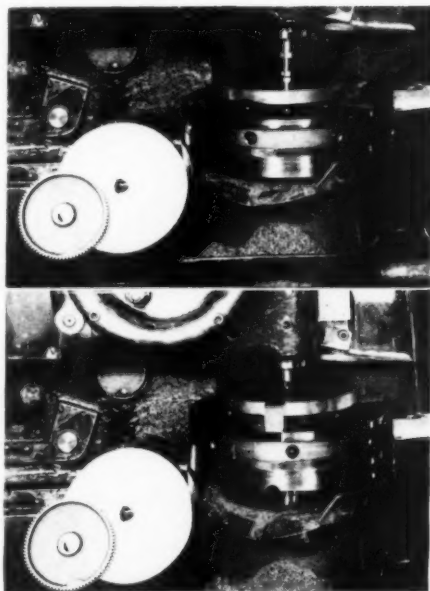
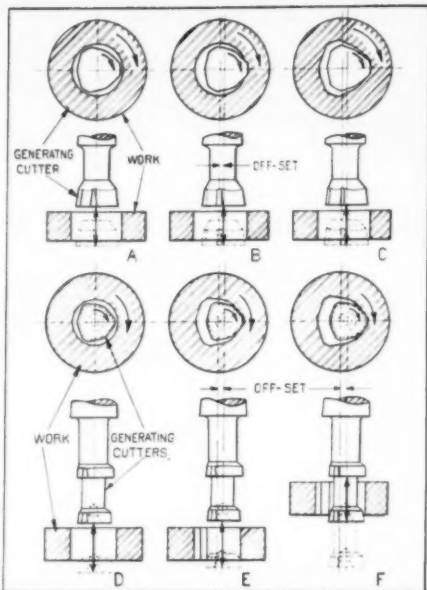
**Fig. 4. Two methods for generating a three-cornered hole.**

5. An air cylinder is connected to a sleeve in the work-spindle, and located on top of the sleeve is a three-jaw chuck for holding the work. The work is positioned relative to the roughing cutter, as shown in the upper view, and the three-lobed hole rough cut. The operator then opens an air valve, and the work is elevated to the position shown in the lower view for the finishing cut, meanwhile cutter reciprocates and work and cutter rotate. When the hole is finished, the machine stops, and the operator lowers the fixture through the air valve, removes the finished part, inserts an uncut piece, and starts the machine.

#### Generating a Square Hole.

Another example of "off-set" generating is shown at A, B and C, figure 6, applied to the machining of a square hole. Here it will be noticed at C that there is a radius left in the corners of the square hole. This radius is equal to the amount of "off-set" of work and cutter centers, and consequently the smaller the amount of "off-set", the smaller the radius produced. In cases, where a large radius is objectionable, a second cut can be taken with a larger cutter, in which case, the amount of "off-set" can be reduced, and consequently a smaller radius in the corners of the square hole will result.

Where a sharp corner in a square hole is required, the ma-

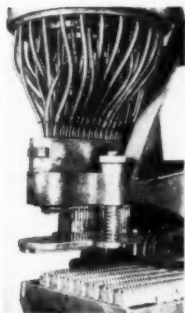


**Fig. 5. Close views of work elevating fixtures used on the gear shaper for rough and finish generating a three-cornered hole.**

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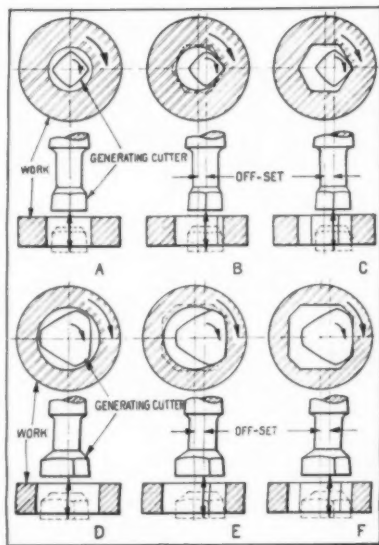
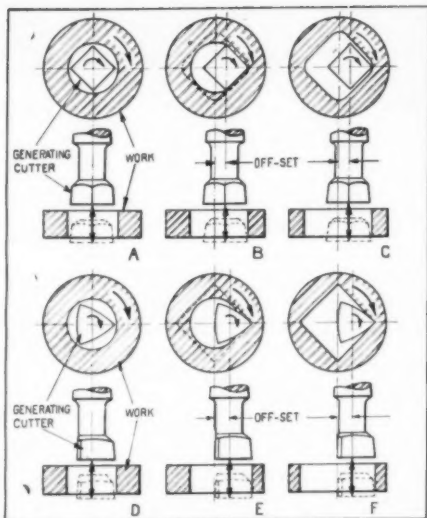
**Fig. 6. Two methods for generating a square hole.**

chining can be done with a three-cornered cutter, as shown at **D**, **E** and **F**, in figure 6. In this case, the ratio is 3 to 4 and the "conjugate" method is used. If the sharpest possible corners are desired in the square hole produced, the "rolling" circle used for generating should pass through the sharp corner on the work and cutter. In this way, the cutter as it reaches the corner "rolls" on its sharp point and greatly reduces the radius. The various stages in the generating of a square hole with a three-cornered cutter are shown at **D**, **E** and **F**, in figure 6.

#### Generating a Hexagon Hole.

In deciding on the shape of the generating tool to use, the shape of the work is the important factor. It is possible, as previously explained, to use a tool having a different shape from that of the work. At **A**, **B** and **C**, in figure 7, a hexagon hole is being generated by a four-sided cutter. In this particular case, a radius in the corners was desired, and the hole was large enough to use a cutter of substantial size, so a four-sided cutter was employed. It is evident, of course, that the sides of the cutter must be curved instead of straight surfaces. In this particular case, the machine was geared to a ratio of 4 to 6.

In figure 1, both square and hexagon holes and the cutters used in generating them are



**Fig. 7. Generating hexagonal and octagonal holes.**

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shown. The work is bolt and nut trimming dies, and the holes must have a slight taper. This is accomplished by locating a taper raising block between the base and bed of the Gear Shaper, so that the axis of the cutter-spindle is located at the required angle to the axes of the work-spindle to produce the desired taper. Such relationship of work- and cutter-spindle axes in no way affects the shape of the hole produced.

#### Generating an Octagonal Hole. The

Fig. 9. Close view of set-up for generating a rectangular hole on the gear shaper.

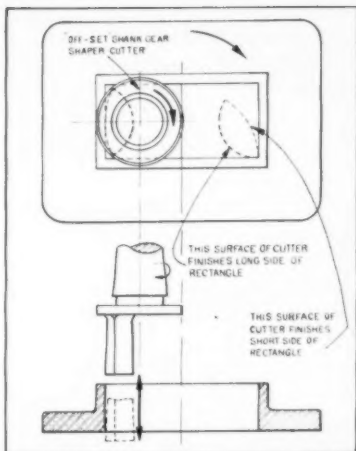
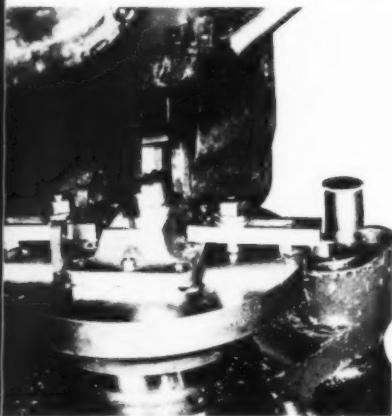


Fig. 8. Generating a rectangular hole.

generating of an octagonal-sided hole is shown at D, E and F in figure 7. It will be noted that all eight sides of the hole are not of the same length, so that it might be called a "double-square" hole. The cutter used is made with six lobes to produce this odd-shaped hole. The sides of the cutter are curved surfaces which are "conjugate" to the straight surfaces on the work. The machine is geared in the ratio of 6 to 8.

#### Generating a Rectangular Hole. The



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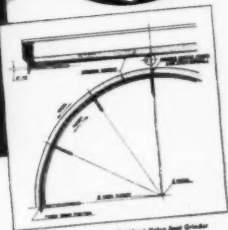
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machining of the rectangular hole shown diagrammatically in figure 8 presents an unusual application of the generating cutter which is located eccentrically or "off-set" with relation to the axis of the cutter-spindle. Two sides of this hole are approximately twice as long as the other two sides, and the hole must have comparatively sharp corners. It will be noted that the "two-lobe" cutter has curved sides of different radii for machining the short and long sides of the rectangular hole.

The "off-set" position of the cutting portion of the cutter relative to the center of the cutter-spindle makes the cutter "travel" a greater distance than the length of the arc on that portion of the cutter which generates the long sides of the rectangular hole. This in

effect imparts a "skidding" action to the cutter when it rotates to the point where the long sides are machined—thus it travels faster—making up for the difference in the length of the arc on the cutter, and the length of the surface machined.

On the other hand, the developed length of the arc on the cutter, which machines the short sides of the hole, is equal to the length of the surfaces machined. The "off-set" location of the cutter does not have any effect on the generating action when the cutter rotates to the positions for finishing the short sides. The machine is geared in the ratio of 2 to 1. Figure 9 shows the set-up on the Gear Shaper, and the cutter used to machine this rectangular hole. THE END.

#### SYNTRON BUYS NEW PLANT

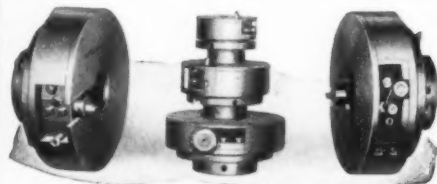
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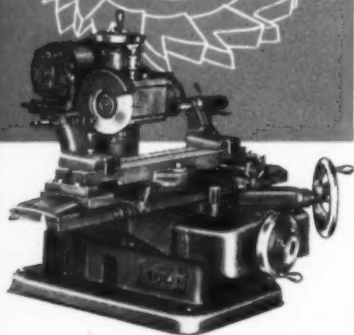
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## MACHINE TOOL INDUSTRY MOURNS DEATH OF HANS B. KRAUT

Funeral services were recently held for Hans B. Kraut, chairman of the board of Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. His demise brought to an end 23 years of active service with Giddings & Lewis, during which time he was greatly responsible for the transition of the company from a small antiquated shop into a modern and well-known machine tool builder.

Mr. Kraut was born in Kraiburg, Germany in 1881, into a family of long-standing mechanical lineage. He received his education in Germany and came to the United States in 1906. He started his own machinery business, which was absorbed by Jos. T. Ryerson & Sons, whose machinery department Mr. Kraut joined. He later became manager of the



machinery department. In 1924, he went to Giddings & Lewis as vice president and general manager. In 1929, he became president and general manager, and in 1945 he was appointed chairman of the board of directors.

In spite of illness, he remained active in company affairs, and found time for civic and public affairs. He was president of the Association of Commerce, active in Community Chest campaigns, a director of the Wisconsin Power & Light Company and of the Wisconsin Manufacturers' Association, a Rotarian, Elk and a member of the A.S.M.E and A.S.T.E.

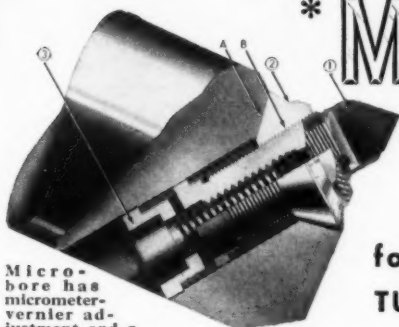
Mr. Kraut passed away in his winter home in Tucson, Arizona.

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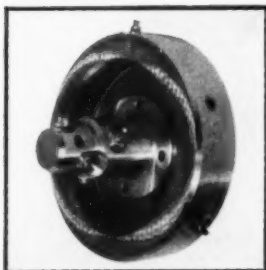
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## "SUPER METALS" ON WAY FOR TURBO-JET, ROCKET AND ATOMIC POWER

A new group of "super metals" and ceramics soon will be available for man's new high-powered machines, the turbo-jet, rocket and atomic energy power plants. Clyde E. Williams, director of Battelle Memorial Institute, Columbus, O., said recently in a speech before the American Society of Mechanical Engineers (headquarters at 29 W. 39th St., N. Y. 18). They will withstand higher temperatures and pressures than materials now available, he said, and so will offer potentialities for power generation that are "simply staggering."

The gas turbine required highly alloyed materials which could withstand high stresses and temperatures up to 1500° F., Dr. Williams said. To secure stability, still more highly alloyed materials must be used and some are practically iron free. The strongest materials suitable for precision casting are the cobalt-base alloys containing 40 to 70% cobalt and such other additions as chromium and molybdenum or chromium, nickel, molybdenum, tungsten and columbian.

Another series of alloys, based on chromium, with upwards of 50% of this metal, promises safe use of still higher stresses. Those metals offering promise besides chromium are titanium, columbium, tantalum, molybdenum and tungsten.

Dr. Williams pointed out that "the gas turbine has met with so much success in aircraft" that it will be extended to numerous other fields, i.e., gas turbines for swing aircraft propellers, for ship propulsion, for running stationary power generation units, etc.

Promising as is the development of turbo-jet powered devices, increasing attention is being paid to rocket propulsion. Already used in jet-assisted take-off, it is now being used for airborne vehicles designed to travel faster than sound. Practical work is under way in the use of atomic energy, but many problems remain to be solved by the engineer.

To meet the highest temperatures, ceramic materials will be called for because they "are the only known materials that will not melt or burn up at such temperatures. They may be used as coatings for metals, as structural combinations with metals, or as individual parts. One difficulty involving the use of ceramic materials is their relatively poor mechanical properties compared with metals."

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## SALIENT FEATURES OF



# Handwheel Design

By H. F. Williams

The type, shape and size of spoke as well as a consideration of finger room, rim and hub are factors influencing the design of handwheels. Handwheels can be balanced by placing offset weights at rim, spoke or hub. Part 2 of this series also concludes the subject of positive grip-type handwheels, begun in the December issue of MACHINE and TOOL BLUE BOOK.

**I**N PART I a number of conventionally shaped rims of handwheels were illustrated and explained. This discussion then lead into various shaped rims in which were incorporated positive grip or finger scallops. Several more examples are included in the beginning of this second part before the subject of spokes is explored.

Figure 28 is a built-up rim of plastic sides centered on a steel flange. The plastic sides are fluted radially in which the corrugations have semi-circular crowns, the outer radii being slightly larger than the ones toward the center. These corrugations extend around the whole circle to where they contact the flange. The two halves are screwed to the flange and upon completion, the joint at the outer periphery all but disappears.

In figure 29, the two halves of plastic shells form a perfect circle at the top of the flutes. The depth of the flute is at its maximum where it joins the steel flange, gradually tapering upwards to disappear at the horizontal centerline at either side. Here, the thumb and fingers grasp the inside of the rim close to the steel flange, while the palm of the hand rests against a smoothly polished plain circular surface. The thickness of wall of the plastic halves is constant from the bottom of the corrugations inwards, and are screwed together see figure 28.

In both of these designs special consideration must be given if a handle is to operate the wheel. If the handwheel is sufficiently large in diameter, the handle might be attached directly to the steel flange, thus sacrificing leverage. However, the handle can be in line

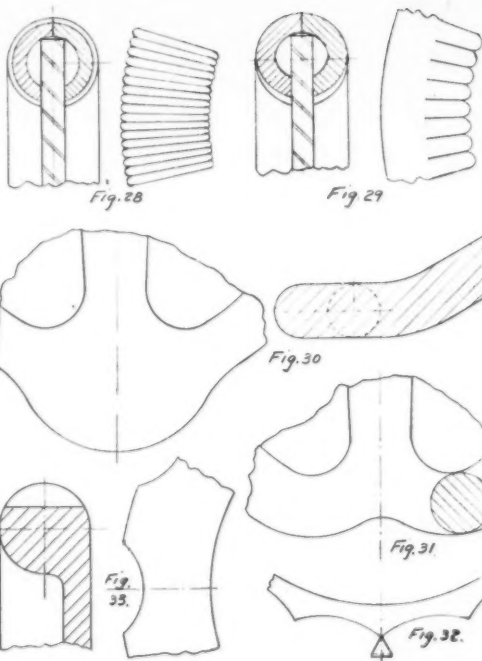
with the centerline of the rim radially if a small, greatly shaped bracket is riveted or screwed to the flange and the handle fastened thereto. The bracket hub for the shank of the handle would naturally protrude outside the vertical face of the elastic rim.

Two unusual designs of handwheel rims are illustrated in figures 30 and 31. The cross section of both rims is round in shape. In figure 30, the wheel has 5 spokes which are dished or where the rim and hub are not in line. This is shown in the cross section laterally through a spoke at the right. Opposite each spoke, the rim is flared to form a positive grip protrusion. The same thickness and radius is used as for the rim. The treatment of the spoke is similar, in that the cross section becomes an elongated circle. The views of a given sketch throughout the various parts of this article are not in true projection. The reason for this is to save space on the printed page.

In figure 31, an indentation takes the place of the protrusion in the rim of figure 30. Strength is not sacrificed as the inside radius where it swings into the spoke is the same location for the outer radius. In both these designs the edge of the hand under the little finger makes the positive grip possible. In figure 30 it engages the raised portion while in figure 31 it sinks into the groove or the same effect.

Figure 32 is a speed or feed setting dial, having a series of long scallops cut to a fairly shallow depth, each terminating at an edge of about  $\frac{1}{2}$ " in length. These edges are set to coincide with a pointer for the correct position radially of the wheel. Only a small section of the rim is shown, with the stationary pointer at the bottom.

The rim of the handwheel, figure 33, is finished all over. In the first part of this article a similarly shaped notch was shown machined at an angle of about



45°. Here, however, the notch is cut straight across or parallel to the axis of the handwheel. If the depth of the groove is as shown the edges do not have to be dressed or buffed. A similar effect can be obtained if the grooves are molded in and the bottoms buffed out. This latter design is less expensive as a milling operation is not involved.

A cast iron handwheel with a central solid web is shown in figure 34. The parallel grips at each side of the web accommodate the tips of the thumb and fingers and are spaced about the circle at a pitch convenient to a spread position of the fingers. The rim is machined round on the periphery and straight down the sides so that the outer faces of the ribs are smooth. They are buffed off afterwards enough to smooth off all sharp corners. The lefthand side of the cross sectioned view is taken down through one of the ribs, the part on the right is sectioned between the ribs.

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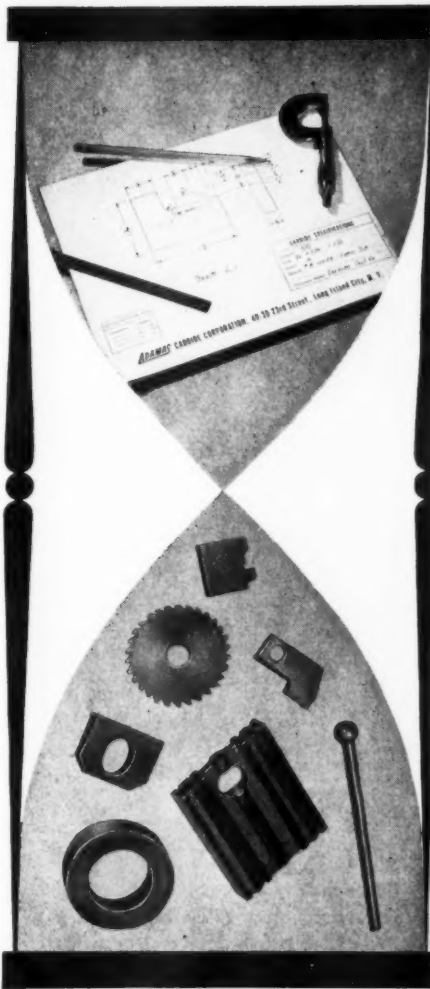
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Small handwheels having an overall spread large enough to fit into a large hand are sometimes made as shown in figure 35. Three to six spokes can be seen but four seems to be most popular. The spoke terminates in a ball into which the rim seems to join, providing sufficient positive gripping surface. The section at the left is through a spoke and ball. The shape of the rim and the spokes as well is of round section. This type of handwheel is left as cast or is buffed smooth. It is sometimes die cast.

Figures 36 to 38 inclusive are some comparatively strangely shaped handwheel rims. Figure 36 is octagonal, so that the creases at the first, second, and third joints of the fingers engage the corners of the surfaces of the octagon. This shape is finished on seven sides, the eight side forming the rib around the inside of the rim. The handle is placed at the center, no extra finishing operation being necessary where the handle pushes up against the rim. In figure 37, the half round periphery is flattened after the round forming operation is completed. This flat is then knurled with a coarse knurling tool, leaving a diamond shape roughened surface. The rim in figure 38 is rectangular in shape. The outside is coarse knurled and each side is fluted completely around the circumference.

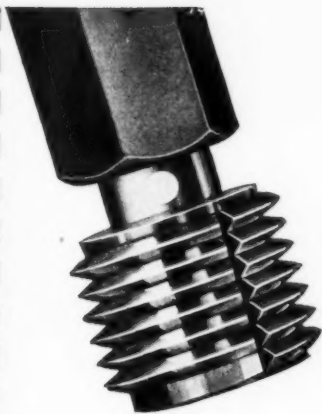
The wide rim in figure 39 is left as it comes from the mold except that the coarsest protrusions are smoothed down. The handwheel is then painted inside and outside. The large curve between the ball and angular rib on the inside of the wheel fits the finger tips conveniently.

The general form of the rim in figure 40 is round section but is shaped angularly into wide scallops at the outermost periphery. From the rounded peak of the scallop down to the centerline the rim is finished off smoothly and the valleys of the scallops are polished out with a soft buffing wheel, charged with abrasive.

The cross sectional shape of a handwheel spoke may assume numerous forms. Probably the simplest is one in which the sides are square, causing the pattern maker not too much concern. Figure 41 shows the rectangular shape in which the corners are slightly sandpapered by the pattern maker to make casting easy. A stronger spoke is shown in figure 42 which forms a cross. This is not quite square, being higher than wide. A tee section (not shown) is another modification that has been used.



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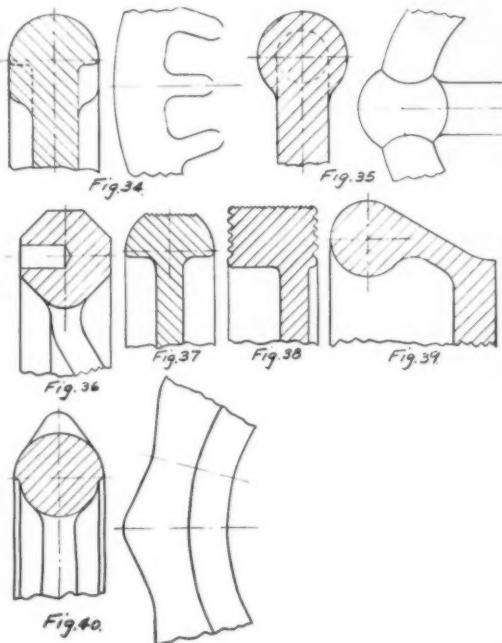
The form in figure 43 is often encountered and is nothing more than that in figure 41 with rounded ends. In figure 44 a third side has been added.

The majority of handwheels observed have spokes of oval cross section, figure 45. For all practical purposes this shape has as much strength as that shown in figure 41 and is more pleasing to the eye. The oval shape possesses a characteristic not found in the rectangular shape or that with rounded ends but with parallel sides and that is that the rounded edges give an appearance of thinness. The thickness at the horizontal centerline can be identical to the rectangular type. A greater contrast when necessary can be obtained by thinning down the edge, figure 48. In figure 47 two ellipses are built up perpendicular to each other for a well shaped and extremely strong arm or spoke. Figure 46 is a modification of figures 45 and 47. The dotted lines in the latter are used only to show the true ellipses. Sometimes the spokes are sectioned round as in figure 49, being tapered from one diameter at the hub. At times the spoke starts round at the rim and tapers downward to an ellipse at the hub.

Figure 50 is a conventionally shaped spoke the shapes of the ovals being a moot question. Designers and patternmakers have argued the merits of whether to have the same radius at the edges of the spoke for its entire length or to taper the radius as well as the sides and thickness. The comparison is shown in figures 51 and 52. In both the large ellipses represent the shape and thickness at the hub. The inner or smallest ellipses represent the shape and thickness where the spoke joins the rim minus the fillets. The center ellipses are the shape and thickness midway along the length of the spoke. In figure 51, the same edge radius is used. The large oval looks pleasing as it is nicely shaped. The inner

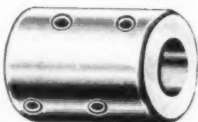
oval looks very flat with an unusually heavy edge. The center oval does not look too bad.

In figure 52, all three ovals assume a pleasing appearance. Here the edge



radius has tapered along with the sides and thickness. The center of the radius from which the major radii are swung is one and the same; this is not so in figure 51. When the major radii are swung from the same center, the edge or minor radii are different. And when the minor radii are the same, then the centers of the major radii are at different places.

There is also another reason why the shape of the ellipses is not agreed upon, in that the patternmaker likes to use a template while whittling down these spokes. If he uses one template for the edge radius he will have shapes as in figure 51. If he also wants to use a template for the major radius, he would have to have three different ones. For



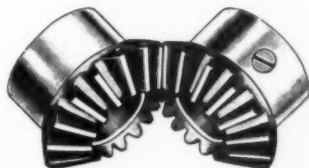
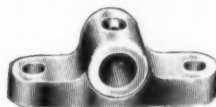
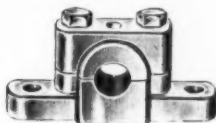
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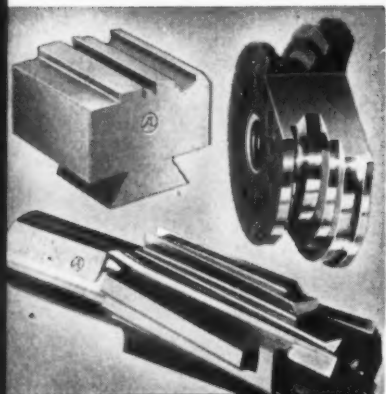


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the ellipses in figure 52, the shapes which seem to be favored by the patternmaker, only one template is used for the major radius for the entire length of the spoke. This might seem contrary to what was stated previously, that the center of the three radii was the same. However, on such a long radius there is very little difference in the height of such a short arc so the designer can use one center and the patternmaker can use a mean radius.

The question of how many spokes to use in a handwheel arises or should arise every time a new one is made. Convention seemed to dictate that a handwheel should look like a flywheel between the hub and the rim, in that 6 spokes looked well. Many handwheels observed have six spokes, many more have other amounts. Three, four and five spokes are also very common. But all designing engineers do not follow conventional lines as will be pointed out shortly with illustrations. A two-spoked handwheel is not uncommon today. Some of these shapes look very well indeed, reflecting the general scheme followed in dressing up forms and contours of machines that are designed or redesigned for better appearance and greater sales appeal.

Diametrically opposite to the discussion of the shapes of spokes, handwheels can be seen having cored holes in the otherwise solid web, thereby giving some semblance of spokes. In a moderately sized handwheel, 6 holes are cut into the pattern as shown in figure 53. These holes are sometimes tangent to both circles representing the hub and inside of the rim. The edges of the holes can be half round so that the fingers when thrust through the holes will not be cut or bruised.

In figure 54, a three spoked handwheel has an abbreviated spoke halfway between two conventional spokes. This short spoke is merely a protrusion at the inside of the rim against which the fingers can rest. In this way a three-spoke wheel has the advantages of a six-spoke wheel as far as hand gripping is concerned.

Relative to the number of spokes in a handwheel, a good rule is as follows: as long as there is sufficient room between two adjacent spokes to accommodate the four fingers of one hand, the wheel can be considered designed correctly. Finger room, both circumferentially and radially as well, determines the efficiency of a machine when operated by hand, to a great degree.

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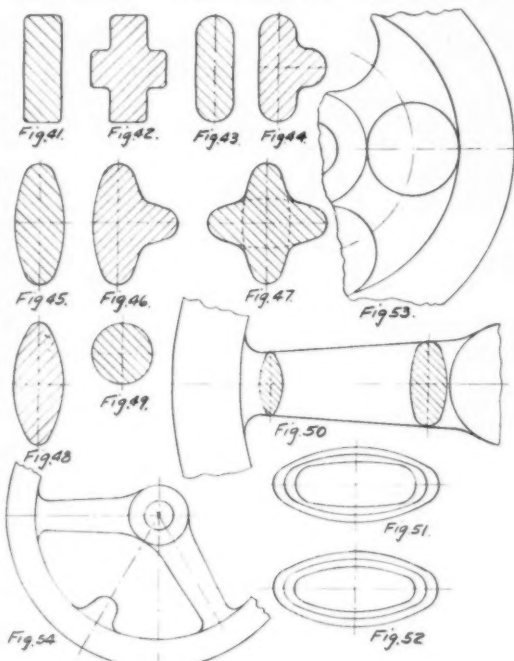
A handwheel with proportions as shown in figure 55 illustrates what is meant by poor design. The space between the spokes at the rim is too small as it will accommodate only two fingers comfortably. The radius where the spoke joins the rim is too small to fit the side of the fingers. Such a radius should not be smaller than  $\frac{1}{4}$ " otherwise the fingers are pinched. The rim, of course, should not be too large in cross section.

In figure 56 a comparatively small, but heavily built handwheel, shows good characteristics as far as finger room and freedom is concerned.

As frequently happens, some handwheels are required to have very large hubs in relation to their outside diameter. Two such designs are shown in figures 57 and 58. Figure 57 has six very short spokes which are longer really a solid web with elongated holes. Ample allowance has been made for finger room and the remaining part of the web towards the center below the opening forms a strengthening rib as can be seen in the cross sectioned view below. Figure 58 has only three spokes which are longer than in the previous example.

Although light-weight handwheels will be illustrated and discussed further on in this series of articles, spokes for fabricated handwheels will be mentioned here. In figure 59, a spider of three spokes appears. The outside radii of the three spokes coincides to the inside radius of the rim of the wheel. Being made of thin sheet steel the edges should be dressed after bandsawing out as shown in the section in the spoke. The corner fillets give a menacing appearance for they are really sharp, but this disappears when they are assembled with the rim by welding. The handwheel looks better because of these large fillets which could not be built up by welding as the spokes were tapered up to an approximate 90° corner. A piece of cylindrical steel stock

is welded to the spoke spider and thereafter drilled and reamed for the shaft. This hub may be turned with a small shoulder and inserted into a hole centrally located in the spider. If the latter design is adopted, the end of the pilot and the hole in the spider should both be chamfered and filled with welding material. Some claim the hub has better support this way and is centralized more



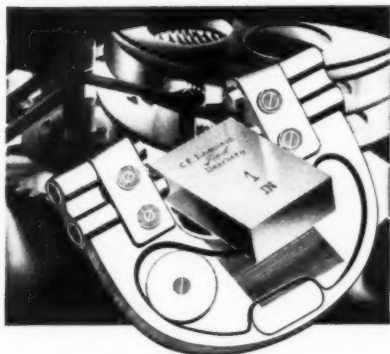
readily.

As mentioned previously, many designs of handwheels having elliptically shaped spokes, show the spoke tapering three ways; along the width, thickness and radius at the edge. Figure 50 shows a pleasing taper for the width and figure 60 shows it for the thickness. This taper need only be a few degrees on a side to have it look right.

In a dished handwheel, where the rim and hub cannot be joined with a spoke having a straight axis, the tapering and curved spoke as in figure 61 is familiar



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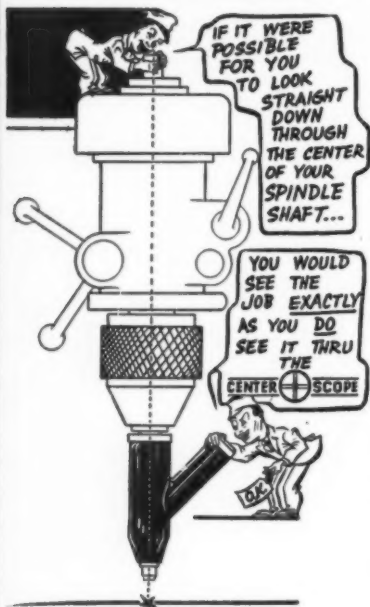
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to the mechanic and designer. Too often however the curves are struck from the same centers giving an appearance of a very fast taper in the middle where the curves join. The same center cannot be used and this becomes more obvious where the spoke is short. To obtain the correct taper, the draftsman must divide the length of the curved centerline and the tapering thickness into the same number of parts and paint off the thicknesses accordingly. A flowing curve with a correctly proportioned taper is a joy to behold and it behooves the designer to strive toward these ends.

The design in figure 63 also shows a right angled spoke but it is well radiused to get away from the 90° effect. The spoke is also tapered both ways even though it is comparatively short in length. This is an unusual handwheel as the hub is nearly as large as the outer diameter of the rim. Finger room is an important item in this design. The distance between rim and flange should not be much less than 1/4" so that when the hand grips the wheel from an angle rather than from directly in front, there will be no tendency to get the fingers in a locked position. The rim is finished and polished as is the hub in to the recesses on both sides and also on the outer periphery.

Spokes in one plane, dished spokes or right angle spokes as in figures 60 through 63 are commonly seen; seldom are curved spokes, figure 64, used today.

A rather different approach to the spoke problem is shown in figures 65 and 66. In the former a single curve is swung from the rim-adjointing fillet of one spoke to the next one. Three spokes are formed in this manner. Although this is an all-cast handwheel, the spoke structure looks very similar to the sheet steel spider in figure 59. In this wheel, the spokes are about 1/2" thick. The shape is unusual, simple, and pleasing to the eye. Figure 66 is also unusual; the four spokes formed by the finger grip openings are so cut out to give a square effect to the hub. This however is simply the remainder of the original web. The hub proper is smaller.

Another example of finger grip space, figure 67, that is unsuitable for the fingers of a large hand. The hub is necessarily big in diameter but is too close to the rim. The space merely accommodates the first joint of the fingers. Not only is it dangerous if a finger is wedged in between the hub and rim, but a good purchase on the rim is difficult.

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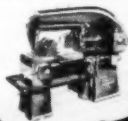
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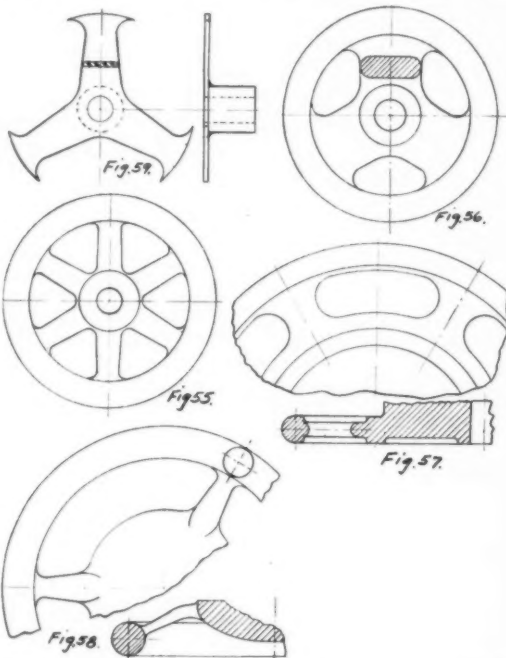
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Many modern machine tools and accessories are equipped with counterweighted or balanced handwheels. After the wheel is rotated, such a designed handwheel can be relied upon not to creep until the handle is at its lowest point. There are three ways in which counterbalance can be obtained. First, counterweight the spoke or arrange the spokes in such an order to offset the weight of the handle. Second, concentrate the counterbalancing weight at the inside of the handwheel rim and third, place the added weight on the hub or near the center. In comparison of the handwheel mass to that in the handle it

a heavy common pin.

To take the first method mentioned above, namely counterweighting the spokes, figures 68 to 75 inclusive incorporate this method of design. These front views are merely diagrammatic for they do not show the cross-section shape of the spoke. The most common method is to use one wide spoke opposite the handle, the latter shown as a circle at the top center of the rim. Figures 69 and 73 show a wide spoke for a 3-spoke handwheel. In the former the spoke itself is wide with three finger-grip openings. The spokes can be conventionally elliptical with conveniently large fillets

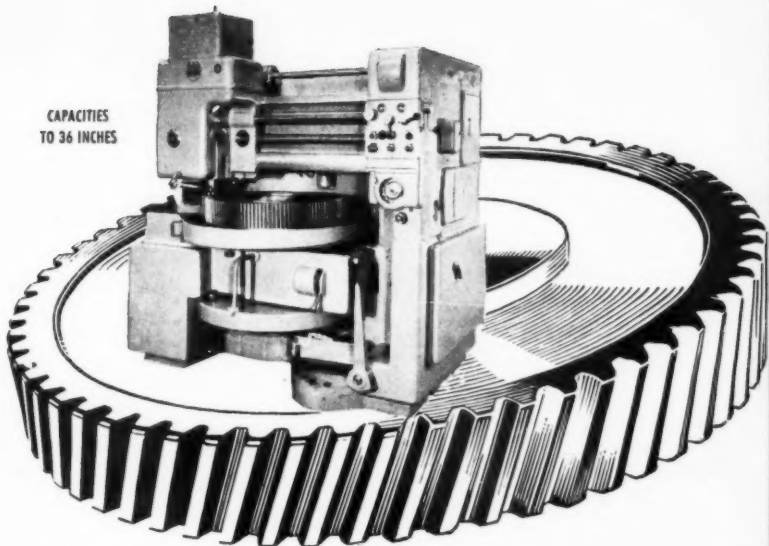


would seem that unbalance would be quite remote. But when it is considered that so many inch-ounces are involved it can be readily appreciated what balance means on some sensitive machinery. The amount of counterweighting should be determined by trial under actual working conditions and not by calculations. The latter method is subject to too many unknowns. Solid handles and rotating or free-revolving types mounted on spindles, are subject to heavier counterweights than the hollow or tubular handles with small diameter spindles. It is not necessary to cast a handwheel and assemble a handle before determining the proper amount of counterbalancing volume of metal that is to be added. It can be done with the wood pattern even though there is a core print at either end of the hub. It is of course necessary to turn up an accurately shaped and dimensioned handle using the same wood is in the wheel.

The weights are relative. The pattern maker can then whittle away excess wood until a good balance is struck. This means the pattern are mounted with handle attached on centers, these centers being as small as possible to avoid friction. Some pattern makers use two centers made of wire no larger than

between spokes and rims. In figure 73 however, only two finger-grip openings appear, there being solid metal between and beyond the purposely drawn centerlines where the two of the three spokes would naturally be. To get this effect and perfect balance also, it may be necessary to thin down the cross-sectional

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183

area of the large spoke.

Figures 70 and 72 are variations of counterweighting a 3-spoke handwheel. In both these designs, an unusual effect is developed. The two balancing spokes in figure 70 extend across the wheel from the centerline downwards. In figure 72, with only two openings, the tops of the lower spoke run approximately tangent to the hub circle. It is interesting to note that in three of the four handwheels mentioned so far, the operating handle is mounted directly opposite one of the conventional spokes. Many designers firmly believe that this is the right location for the handle, as the metal about the hole in the rim for the handle shank is reinforced or at least supported by the adjacent spoke. In figure 69, it will be observed that the handle is in the rim, midway between two spokes.

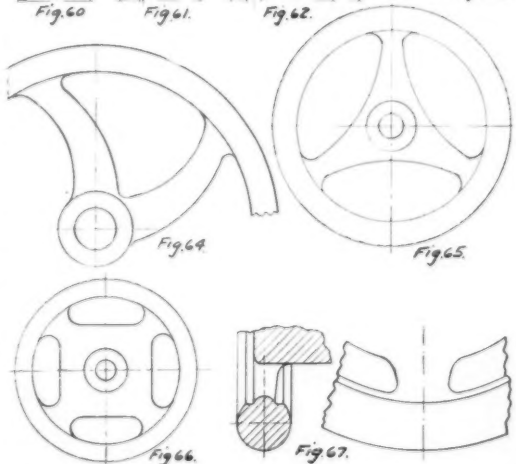
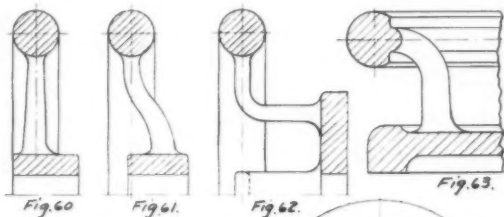
If the rim is husky enough, no ill effects will be manifested. In fact more and more applications are appearing with the handle in this hitherto unconventional position. The writer has never heard of a failure from breakage when this particular design has been used.

Before proceeding to some really interesting types of handwheel spoke design, the four-spoke wheel in figure 75 is an interesting example of counterbalancing. The spoke at the lower center opposite the handle is not only very generously flared on either side but the spoke is made slightly thicker in cross-sectional area to offset the weight of the handle. It might be desirable to eliminate the extra large fillets at the lower spoke where it joins the rim and use the same radius as is shown at the other spokes. It is then necessary to provide the additional weight in the spoke proper.

In the remaining three design, figures 68, 71 and 74, only two spokes are used. We must stretch our imagination slightly to call figure 71 a

two-spoked handwheel. In figure 68, the curve along the upper side of the spoke is a true radius tangent to both the hub and the rim. The lower edge is tangent to the hub and is connected to the rim with smaller radii. The designer who originated the 2-spoke affair in figure 74 had a novel idea. The upper spoke is conventional even though slightly wide in proportion to the hub and rim diameters. He merely extended the same tapering lines past and tangent to the hub to the opposite side using a pleasing and finger-fitting radius as a fillet.

A two-spoke effect results in figure 71 by coring a hole sufficiently large to be tangent to both the hub and rim. This is somewhat similar to the design shown in figure 68 although the finger room is not as practical. It will be noted



that in 2-spoke design only figure 74 has the handle opposite a spoke. If these handwheels illustrated in figures 68 to

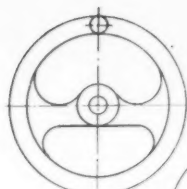


Fig. 68

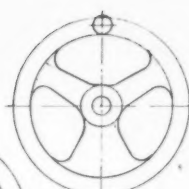


Fig. 69

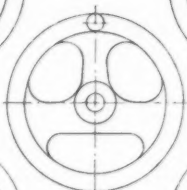


Fig. 70

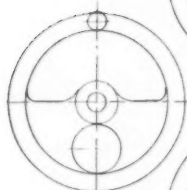


Fig. 71

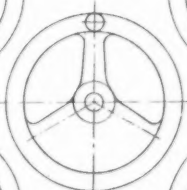


Fig. 72

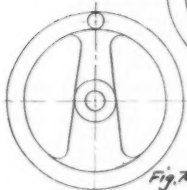


Fig. 73

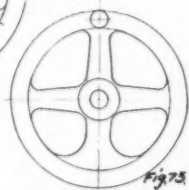


Fig. 74

74 inclusive could all come to rest in the position shown or perhaps 180° around (turn the magazine up-side-down to get this effect) they would look very proper on a machine. But when they are in any other position, let us say 90° around, the appearance on the machine becomes somewhat startling. If the hand-wheel comes to rest at any other angle

such as 30°—45°—or the like, the effect is even more weird. Nevertheless, this article is presenting all types and varieties, so the reader can draw his own conclusions.

In the next installment, Part III, more balanced handwheel designs will be shown, where the balancing is done either at the rim or at the hub.

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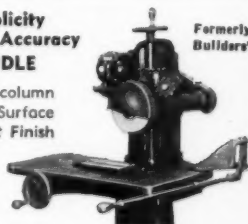
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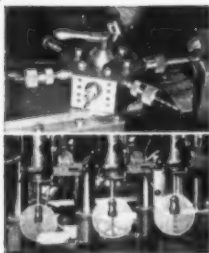
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## SIDEWALK HEATING SYSTEM BEATS NEW YORK'S BLIZZARD

New York's recent blizzard, which piled snow on the city streets and sidewalks so high that they were impassable in many places, found Best & Company's Fifth Avenue store easy of access to pedestrians.

In fact, there was no snow at all on "Best's" sidewalks. They formed an oasis on one of the world's best known streets. Hundreds of men and women, after trudging through knee-deep snow, paused for a "breather" at Best's, Fifth Avenue and Fifty First Street. Many

of them could not understand why the nearby sidewalks were piled high with as much as three feet of snow, but here the sidewalk apparently was immune from the elements.

The reason for this seeming freak of nature was explained by Carroll M. Baumgardner, chairman of the Executive Committee of the Institute of Boiler & Radiator Mfgs., and executive vice-president of the United States Radiator Corporation, Detroit, Mich. The Corporation furnished some of the equipment for this job. Mr. Baumgardner said:

"About a year ago, Best & Co. installed a hot water heating system under its sidewalks. The purpose of the system was to melt the snow as fast as it fell. Hot water, from 110 to 150 degrees F. flowed through the 7000 feet of wrought iron pipe, coincident with the 25.8 inch snowfall. The result

was a sidewalk so warm that the snow did not accumulate. It turned into water almost immediately."

Mr. Baumgardner pointed out that before the sidewalk-heating system was installed, the store had difficulty in disposing of the snow after it had been cleared from the sidewalks. It is said to be the first of its kind in New York City. There has been only one complaint about this sidewalk heating system. A girl of six, accompanied by her mother, said in effect that Best's was "unfair" to children. "I can't use my new Christmas sled here."



# THE FOREMANSHIP FORUM

By Edmund Mottershead

## ESSENTIALS OF GOOD FOREMAN TRAINING PROGRAM

Alfred P. Sloan, when president of General Motors Corporation, stated: "The human problem is far more delicate and difficult to handle than any production, distribution, engineering or financial problem. Psychology and personality constitute at least 50% of the material requirements for success as an executive. I have seen men with fine minds who failed to make their plans effective because they lacked understanding of how to work with people. In our business I should say that this psychological ability means 75% of the necessary equipment. The ability to get people to work together is of greatest importance."

Many foremen reach their positions because of seniority, because they have mastered the technical features of their job or of several jobs in the department. In talking about foreman training or a self-improvement plan for foremen and supervisors, I am thus taking it for granted that the foremen are fully competent in the technical knowledge of their jobs.

However, the foreman's work is not mainly with the machines and methods and materials; his big problem is getting people to work with him and with each other. That the foreman or supervisor can increase his skill in handling people through a definite training program has been proved beyond question. HOW MUCH his human relations skill will improve is another matter. That depends at least to a large extent upon

the company's training program, which among other things must include these four elements:

1. The individual foreman or supervisor should enter into the training program with a strong desire to learn and use new skills.
2. He should have set before him definite and specific objectives, not only "units of learning" but definite results to be obtained in the department.
3. There should be a definite program, set up in writing.
4. There should be adequate means to check progress regularly.

### 1. STARTING WITH A STRONG DESIRE

The importance of starting any program of self development with a strong desire cannot be overemphasized. Dale Carnegie, who has trained some 6,000 business men and industrial executives every year since 1912, says: "If your desire is weak and flabby, your achievements will also take on that consistency. But if you go after this subject with persistence . . . nothing can stop you. Therefore: arouse your enthusiasm for this study. Enumerate its benefits. Think of what it may mean and ought to mean in dollars and cents. Think of what it may mean to you socially . . . of the leadership it will give you."

Which is all very well . . . if the foremen can be given adequate incentives by top management. In training salesmen, for instance, training plus effort plus supervision yields increased

sales and increased commissions. Percentages of increased personal earnings run as high as 35% in as little a time as six months after training. That gives the salesman an incentive to study, to master the elements in his training program.

The foreman all too often has no such incentive. In many plants his weekly check is already less than that of the skilled union member getting time and a half for overtime and working a total of possibly 50 hours a week. Too often management asks the foreman to join in a training program, having meetings in the evenings, neglecting to pay him for the time, and even demanding that the foreman pay for the training course itself. To make matters worse, the foreman is offered no more management support, no more authority, no more promotion and **NO MORE PAY** if he does take the training successfully.

Therefore, in order to foster the fore-

man's strong desire to learn, top management must provide incentives which include:

A. Immediate compensation for time and effort. If in the evening, provide their transportation and dinners.

B. Bear the cost of the training and let the men know that you are glad to do it for them because they are important to the top management and an important part of management.

C. Base selection of trainees on some standards like length of service, experience, aptitude, character, etc., so that the group in training is a "picked" group. Set these standards to meet local conditions.

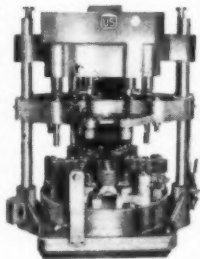
D. Set up a definite merit rating program of foremen and supervisors, geared to the training program, so that promotions and salary increases may be foreseen by the men as the result of training plus effort on their part. Make it pay off for them. **IN CASH.**

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E. Sell them on the idea as an overall program that this training is only part of a total program to integrate the foremen as a real and effective part of management. Assure them of 100% backing from top management if they apply the principles learned.

## 2. SETTING UP DEFINITE OBJECTIVES

There are two types of objectives to consider here: personal objectives of foremen and supervisors, and organization objectives of top management.

Personal objectives of foremen and supervisors are expressed by the men in terms of increased income, promotions, recognition for merit, bonuses, etc. If the training is geared to a definite merit rating program, the personal objectives of the foremen in training can be clarified and satisfied. If the training is geared to group bonus or other income-incentives, the foremen have their personal objectives made still more definite.

Management's objectives should be specifically stated in terms of a goal of such-and-such percent less grievances, less turnover, more production, less scrap, etc. Be specific. Whether the goals are attained or not, or exceeded, at least the training in the minds of the foremen is aimed directly at their departmental problems and thus justifies the merit rating set-up.

## 3. A DEFINITE PROGRAM . . . IN WRITING . . . CONDUCTED BY AN "OUTSIDER"

There are a number of outside agencies which have "prepared" foremanship programs, but most of these do not fit easily into individual plant needs. One or two agencies establish tailor-made programs for their clients. The program should be in writing, a definite time schedule set up with meetings about once a week, not more than 2 hours in length. The best length of program has been found to be from ten to fifteen weeks, with a break of a couple of weeks and then continue another ten weeks or so.

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A good program might follow the broad general lines outlined below:

1. Instruction and training to increase the foreman's efficiency as the supervisor of a production unit. Method of performing his own work, means of eliminating waste, safety training,

worker-training and placement, and methods of adjusting workers to their jobs.

2. Education in company policies. Administrative education concerning basic principles of company policies as developed and applied in the individual plant, customer relations, quality of product working conditions, community relations etc.

3. Human problems of employment relations. Education in basic labor legislation and personnel administration as well as in the field of employment regulations. If possible, the specific policies and regulations of the company, so that they may be thoroughly understood by the foremen and interpreted by him to his workers. This should include a study of the written presentation of the company's policies and regulations . . . if there is such a document; a study of the fundamentals of harmonious relations with employees; a study of the factors that enter into the



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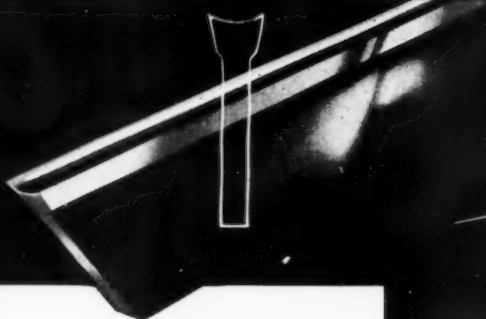
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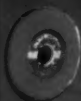
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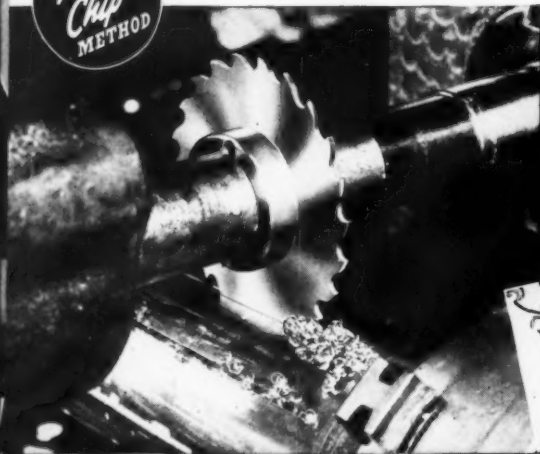
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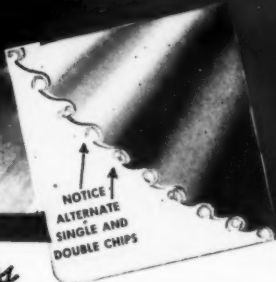


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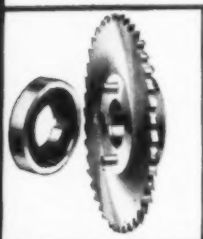


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Motch & Merryweather's original drive equalizes stresses, makes blade keyways unnecessary.

M. & M. Slitting Saw Blades enable you to profit from record-breaking speeds and satisfying accuracy. They give you all the well known advantages of the Triple-Chip Method. The characteristic M. & M. curved, cam-generated tooth contour avoids clogging, since the curling chips are self-clearing. A generous gullet imparts great strength to the teeth. Result: faster cutting, longer blade service.

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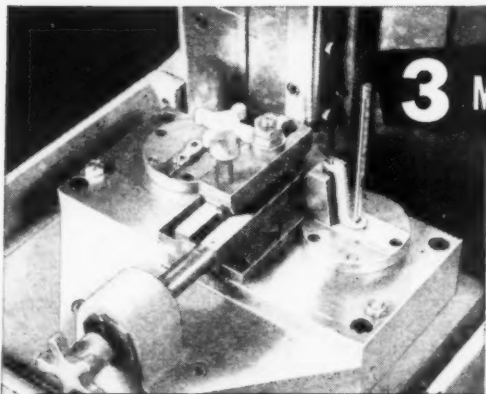
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You Can Do  
**PULL DOWN  
 INTERNAL BROACHING**  
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 INTERNAL BROACHING**  
 and **SURFACE BROACHING**  
 on the *American 3-way*

**A**merican 3-Way Broaching Machines are general-purpose machines that can be used efficiently on many classes of work. They are adaptable to internal broaching (both push down and pull down) and surface broaching, and are easily changed over from one operation to another.

American 3-Way Broaching Machines are easily operated, highly productive, and flexible in their applications. Their quick change-over makes them especially suitable for broaching in limited quantities. Six standard models are available—4, 6, or 8-ton sizes with 24" stroke, and 8, 10, or 15-ton sizes with 36" stroke.



Photo at top of page illustrates one of many multiple tooling arrangements possible on the American 3-Way. Permanent tooling set up is adapted to either surface broach a slot at the center station, or internal broach flatted holes at left and right hand stations. *Left:* Parts for automatic transmissions before and after broaching. Small part at top is shown before broaching to form slot and finish flatted hole. Flatted hole has also been finished in lower section of center part. *Right:*

A sliding fixture locator is used at the center station of this American 3-Way Broaching Machine to allow loading and unloading clear of broach assembly. At other stations parts are located by pins.



Full details and specifications on American 3-Way Vertical Hydraulic Broaching Machines are given in this new illustrated bulletin. Write for your free copy. Just say "Send me Circular 100B."



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A DIVISION OF SUNDRAND MACHINE TOOL CO.

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adjustment of the worker to his job, his fellow workers, and his company; a study of the best ways to introduce and explain changes to the workers; and a study of the psychology of human behavior to enable the supervisor to build morale, maintain discipline and get cooperation.

4. Cost and product information. Executive information that will enable the foremen to handle the fundamentals

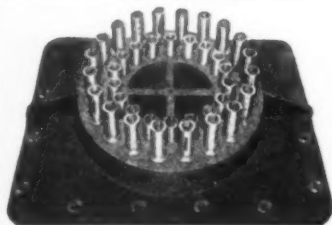
of wage incentive plans, cost analysis, departmental budgets and production schedules, production control, inspection and quality control, routing and dispatching, job analysis and merit rating.

5. Basic information . . . background information regarding the general problems affecting all business and industry, as well as the particular company's business, including taxation, government expenditures, legislation, distribution of income, and business economics.

The question of having an outside instructor does not mean getting someone unfamiliar with the industry, but may be solved either by employing a training specialist in the industry part-time, or by borrowing an executive from another company. The point is that when the local program is conducted by the plant engineer or some other executive, it is all too easy for the leader to be in St. Louis on the day scheduled for the meeting; he is all too susceptible to the suggestion to postpone the thing for another week while they work out the trouble in Department 14. The outsider, if nothing else, commands a little more respect and consideration from all concerned simply because he is an outsider.

#### 4. PROVIDE A MEANS TO CHECK PROGRESS REGULARLY

Nothing succeeds like success. When starting out on a new program, even with a strong desire to succeed, the learner needs to have encouragement, needs someone to show him that he IS making progress. Having a definite written outline of the program to be covered means that a constant check is kept on the learning progress from the standpoint of material covered. Having specific objectives in terms of departmental results provides another means of checking. The merit-rating and performance-rating systems provide another means. When the supervisors



Pictured: a 38-Spindle Heavy-Duty Drill Head.

### DESIGNERS AND MANUFACTURERS OF MULTIPLE DRILLING EQUIPMENT

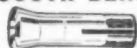
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Steel and Brass Collets for use in any make of lathe or other machine that they will fit.  
SPECIFICATIONS

Collet No.	Thread Dia. In.	Thread Length In.	Ths Per In.	Body Dia. In.	Collet Length In.	Head Dia. In.	Head Taper Deg.
3	.650	3/4	26	.6495	2-11/16	.852	12
2	.855	13/16	20	.8595	3-5/16	1.095	15
5	1.250	3/4	20	1.2495	3-9/32	1.452	10
4	.950	13/16	20	.9495	3	1.150	10

	No. 3	No. 2	No. 5	No. 4
STEEL COLLET	\$3.75	\$4.00	\$4.75	\$4.25
BRASS COLLET	2.00	2.25	2.50	2.35

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and foremen can see their own progress and can get periodic and honest recog-

nition for that progress, they have an additional urge to continue to improve

## TOP MANAGEMENT CHECK LIST ON FOREMAN AND SUPERVISOR TRAINING PROGRAM

	YES	NO	
1. Do you pay your foremen for the time they spend in training session?	—	—	
2. Do you hold your meetings at the most convenient time of day <b>for them</b> ?	—	—	
3. If your sessions are held in the evening, do you provide dinners and transportation?	—	—	
4. Do you buy the training for them, including all books, materials, instruction, etc.?	—	—	
5. Do you have standards upon which to select the men who will participate in the training?	—	—	WHY NOT?
6. Do you have a merit rating system for foremen?	—	—	
7. Have you coordinated the foreman merit-rating system with your foreman training program?	—	—	WHY NOT?
8. Can your foremen see the pot of gold at the end of the training program? Bonus or promotion?	—	—	
9. Are your men convinced that if they apply the principles and policies they learn, they will get 100% backing from the front office?	—	—	YOUR FAULT?
10. Do you consider the personal aims and ambitions of your foremen in setting up a program?	—	—	
11. Do you express management objectives in in specific terms of production gains, waste reduction quotas etc.?	—	—	TRY IT!
12. Are your foremen and supervisors all able to express themselves sufficiently to really take part in a conference or discussion?	—	—	
13. Have you tried a truly "tailor-made" program?	—	—	
14. Does your program include education in company policy?	—	—	
15. Does your company have a written outline of rules and regulations?	—	—	
16. Do you use an "outsider" as conference leader or instructor?	—	—	

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**Light, Compact  
Easily Moved About  
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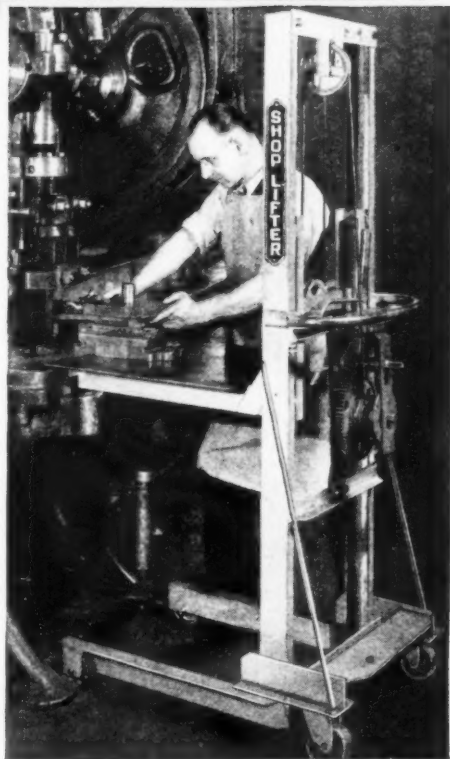
**Saves Production Time**

**in handling dies and heavy  
fixtures; stacking barrels,  
boxes, etc.; loading and  
unloading trucks**

## *Specifications*

**type—D**  
**capacity—500 lbs.**  
**overall height—72"**  
**latform lift—54" above floor  
level, lowers to within 5" of  
floor**  
**base frame—24" wide x 33" long**  
**latform—24" x 24", steel plate**  
**entire frame of machine of structural  
steel, electrically arc  
welded throughout**  
**casters—4" diameter, iron  
wheels**  
**rank up and down hoist unit**  
**two swivel casters and two stationary  
wheels with push bar  
furnished**  
**paint—olive green finish**  
**weight—250 lbs. (approx.)**

*heavier capacities up to 5,000 lbs.  
also available. Write for details.*



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## **ECONOMY ENGINEERING CO.**

# Letter from England



Written for the **MACHINE** and **TOOL BLUE BOOK** by Robert Hutcheson, Editor of **MACHINE SHOP MAGAZINE**, London, England.



This letter is being written on Christmas Eve, and towards the close of a year that has seen the nationalisation of the mines, and has prepared us for nationalisation of our railways on New Year's Day. Fuel cuts which paralysed British industry, and the launching of our biggest production drive are but two of the varied happenings of an eventful year.

During a recent visit to Scotland (the Glasgow area, to be precise) I found rather more optimism than prevails further South, and in certain works the employees were certainly going all out. At one very large aluminum foundry, for instance, everyone was working with a will, and although this existed throughout the establishment it was, naturally, more easily recognised in the mechanised sand casting and die casting sections.

Shipyards on the Clyde are busy. One Port Glasgow firm have on hand an order for four tankers, each of 13,000 tons dead-weight, for Norway. Two similar vessels, also for Norway, are being built by another firm. It is interesting to note that the first of these yards, Lithgows, Ltd., have launched eight ships this year and were hopeful of launching the ninth before the close of 1947. Three of these are also for Norwegian owners and are cargo vessels of 9,300 tons dead-weight.

Two American-built, and now British-owned, vessels are on the Clyde. These are all-welded T2-type tankers owned by

the British Tanker Co., the **Mesa Verde** (10,448 gross tons) built by Kaiser at Portland, Oregon, and the **Rogue River** (10,172 gross tons) built by the Alabama Shipbuilding Co. They came in for overhaul and repair, the first of them now being completed.

One of the bottlenecks of British industry is the coal shortage, which is a paradox in view of the vast amount existing in these islands. More mechanisation of mining is one of the solutions to coal production, and steps are being taken to try to get release from the Forces of men previously engaged in the building of coal mining machinery. Only fully skilled men, and apprentices who were in their final year when called up, are eligible for release.

Changes are being made in the giant Nuffield organisation. Viscount Nuffield and some of his fellow directors have decided that more young men are wanted at the head of our automobile trade in order to push a vigorous export policy. Six directors have therefore retired to make way for younger men. As a part of the export policy it is desired to set up a more centralised control and to reduce overhead expenses.

Viscount Nuffield has decided to devote £1,000,000 to the promotion of overseas sales. It is necessary for the British motor industry to decrease its prices of cars

abroad in order to meet competition by car makers of other countries, and the plans now in hand are intended to allow the Nuffield organisation to take this course.

At this time of the year it is customary for some of our large engineering firms to issue a report on their work during the past year. One such report that has just reached me is from the English Electric Co., Ltd., Stafford.

They now have a separate group of new laboratories devoted to nuclear physics and include, in course of development, electrostatic generators of 2 million and 5 million volts for accelerating electrons and protons, synchrotrons with a range of 30 million volts, impulse equipment for heavy current discharges at 1 million volts for producing pulses of electrons or X-rays of very short duration and apparatus for measuring radiations from machines used in nuclear physics research.

Hidro-Eléctrica Espanola, Spain, has placed a large comprehensive order with The English Electric Company for the equipment of the power station at Cofrentes on the River Júcar in the neighbourhood of Valencia. The equipment consists of intake gates, pipelines, three 56,000 h.p. vertical reaction water turbines with relief valves and straight flow main valves, 136 metres head, 300 r.p.m.; three 36,000 kW vertical generators, 13,800 volts, 50 cycles; one 600 h.p. auxiliary set, switchgear and transformers.

Several important contracts for Scotland were placed with the Company by the North of Scotland Hydro-Electric Board, following that for the four 45,000 kW sets for Loch Sloy.

One contract is for the Mullardoch-Faskyle-Affric project which is located in Ross-shire. The plant consists of three 33,000 h.p. vertical reaction water turbines, 490 ft. head, 375 r.p.m. driving 22,000 kW, 11,000 volts, 50 cycles generators.

Another is for the Glen Shira project and consists of one 56,000 h.p. unit for installation in Clachan Power Station on Loch Fyne. The turbine is of the vertical reaction type, 897 ft. head, 428 r.p.m., and will drive a 40,000 kW generator.

Further contracts are for Gaur Power Station in the Pitechry area and for Lurchart Power Station which is N.W. of Inverness on the Conon River. The former

will contain one 8,400 h.p. vertical reaction unit, 78/96 ft. head, running at 214 r.p.m. and the latter two 16,750 h.p. vertical reaction units, 145/185 ft. head, 250 r.p.m.

Another order was for a further unit for the Tarraleah power station of the Tasmania Hydro-Electric Commission. This is a duplicate of the two sets previously supplied and consists of a 21,000 h.p. horizontal impulse turbine, 940 ft. head, 428 r.p.m. driving an 18,750 kVA alternator.

A recent order has also been received for new hydro-electric plant for Sengulam Power Station in Travancore State. This consists of two, and later four, 12,000 kW sets comprising horizontal impulse water turbines, 1130 feet head, coupled to 3 phase, 11 kV, 50 cycles, 500 r.p.m. generators, and includes the switchgear and transformers.

The Shipbuilding Employers Federation and the Confederation of Shipbuilding and Engineering Unions have recently concluded an agreement which provides that the recruitment and training of apprentices for the industry will be controlled nationally by a National Joint Apprenticeship and Training Committee, and in districts by Local Joint Apprenticeship and Training Committees. The National Committee will be meeting shortly to work out details of the scheme.

#### **OHIO STATE UNIVERSITY SETS UP DEPT. OF WELDING ENGINEERING**

Establishment of a Department of Welding Engineering, the first of its kind in the nation, was announced at Ohio State University, Columbus, Ohio, by President Howard L. Bevis.

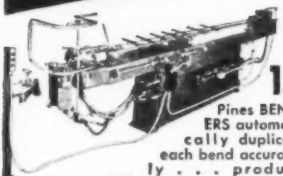
In the College of Engineering at the University, the new department will offer undergraduate work leading to the degree of Bachelor of Welding Engineering and advanced study for graduate engineers.

A pioneer in the field of welding engineering, Ohio State's College of Engineering has offered a curriculum in this field for some nine years, as a division of the Department of Industrial Engineering.

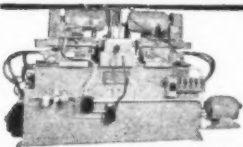
Establishment of the division as a separate department was authorized by the Board of Trustees on the recommendation of the College of Engineering and the Faculty Council.



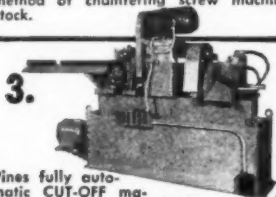
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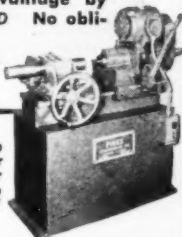


**3.** Pines fully automatic CUT-OFF machines produce up to 1500 pieces per hour . . . quickly interchangeable tools, either parting tool bits or rotary cut-off discs . . . capacity from 1/2" to 2 7/8" O.D.

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These four outstanding Pines machines accomplish worthwhile savings in time and money . . . and offer the ideal method on a wide variety of pipe and tube work. Pines engineers will recommend the proper size and type of Pines machines for your specific pipe and tube fabricating jobs. Today . . . write for this free consultation service.

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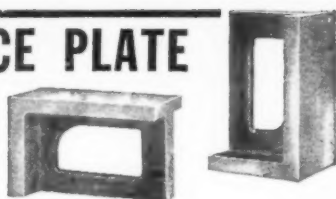
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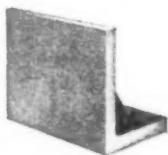
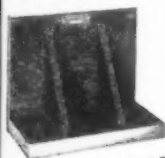
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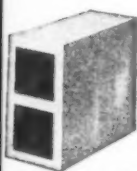


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# News of the ..... industry.....

## ADVANCE SPACE SALE AUGURS SUCCESS OF ASTE EXPOSITION IN CLEVELAND

Following a meeting of a general policy committee, the American Society of Tool Engineers (1666 Penobscot Bldg., Detroit 26) has announced latest developments in the Sixth Annual A.S.T.E. Industrial Exposition to be held in Cleveland, March 15-19, 1948, coincident to the Society's Sixteenth Annual Meeting.

William Bradford Peirce, president of the A.S.T.E. said that exhibit space sold thus far guarantees beyond the shadow of a doubt that this Exposition will be the largest in the Society's history. The A.S.T.E. chief attributed this to (1) the highly successful show they sponsored in April 1946; and (2) the tremendous increase in membership since the 1946 Exposition . . . now standing at well over 18,000.

"This early space sale, with additional applications coming in daily, is most encouraging," Peirce said.

Peirce also stated that the 1948 Exposition and Annual Meeting, "the only one of its kind in the world," will bring together tool engineers from throughout the United States, Canada and from abroad. He said:

"They will meet to exchange knowledge of new tools and processes. These men of mass production will view the Exposition with special interest this year because we are faced, more than ever before, with the problem of turning out more goods at lower prices—and at the same time paying higher wages—to combat inflation. New devices, including developments in tools and processes brought forth since this peacetime push for production started, will be on display. Some of these innovations have recently been brought into this

country from various European nations.

"Tool engineers, the men who represent the hub of our mass production system, are faced with an even more serious challenge than they met in war-time. We must increase production quickly and with the least possible cost if we are to do our part in having the peace for which we paid so dearly. This Exhibition of methods and techniques is designed to help in accomplishing this."

"Now, instead of producing primarily for ourselves, we are having to supply goods and products for most of the world. This puts an extra tax on our production facilities."

The tentative program for the Exhibition includes plant tours in the Cleveland area, discussions by informed speakers on many aspects of mass production, and a formal banquet.

The Fifth Exhibition, held in Cleveland April 8-12, 1946 exceeded even the most optimistic estimates. Attendance totaled 58,831, representing tool and production engineers from every state in the Union, Canada and several foreign countries.

Peirce pointed out that the Sixth Exposition, like the Fifth, will be limited to industry attendance and admission is by invitation only. He said that this policy was adopted because excluding the general public from the show facilitated the contacts between visitors and exhibitors, which is the real reason for putting on the show.

In addition to the exhibits, the concurrent important technical sessions will be featured in the A.S.T.E. Exposition and Annual Convention. Experts in tool engineering will discuss the latest developments.

## P. M. I. STATES CASE OF STAMPING INDUSTRY VS. STEEL SUPPLIERS

At a meeting of the Cleveland District of the Pressed Metal Institute in November, the steel suppliers and the stamping industry fought one round to a draw in the case of the tardiness of the steel suppliers in supplying the stamping industry with sheet and strip steel.

The stamping industry was ably represented by Tom J. Smith, Jr., president of the P. M. I., and the steel suppliers' case was defended by Charles M. White, president of Republic Steel Corporation, which is the third largest steel producer in the nation.

Mr. Smith placed the responsibility right at the steel suppliers' door for the growing gray market, and accused them of diverting the bulk of their supplies to their own stamping companies as well as giving the cold shoulder to old customers who happen to be located at a considerable distance from the mills. Failure to expand present facilities was also on the list of reasons for the short supply available.

Mr. White, on the rebuttal side, presented facts and figures in answer to the aforementioned accusations and somewhat cleared the air.

Up to that time, the P.M.I.'s invitation to steel executives to attend a meeting and state their case had been ignored with one exception. The significance of the meeting lies in the fact that Mr. White did appear to answer charges.

The Pressed Metal Institute has been actively campaigning since November, 1946 to correct the situations outlined above and to this end has proposed:

1. That the steel mills recognize the seriousness of the "gray market" and set up procedures that will, as far as pos-

sible, insure the use of the steel by the purchaser and in the event he cannot use the steel shipped, enter into an agreement whereby he will sell it back to the steel company at the purchase price.

2. That steel companies carry out in good faith the informal engagements entered into with Government authorities as a condition for removal of Government control of steel distribution on a basis of prewar history of purchases.

3. That steel company-owned stamping companies be treated the same as independent stampers in the allocation of steel sheet and strip.

4. That steel companies recognize the historical position of stampers with steel producers now absorbed by them and allocate steel to these companies as though they were customers of the present owning companies.

5. That steel producers resume shipments of hot rolled steel to those stampers having a historical position as to its use.

6. That allocation of steel based on historical position be made regardless of geographic location of customer.

7. That steel mills fill orders from stampers who have a historical position with the company, regardless of size.

8. That the Government greatly accelerate at this time the sale of surplus ships, obsolete war material and all other property that is now or will eventually be sold as scrap.

9. That the Government speed the collection and preparation of scrap now in European harbors, and on battlefields of Europe and North Africa.

10. That the scrap, ingot and semi-raw steel requirements under the Marshall

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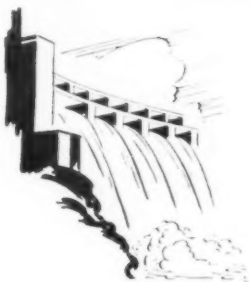
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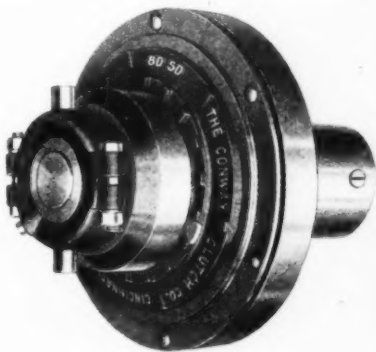
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Series 50 Tandem Plate Sleeve Clutch

**THE CONWAY CLUTCH CO.**

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Plan be carefully screened giving due consideration to the further possible disturbance to the domestic market.

11. That the steel companies give due consideration to the present and probable future per capita requirements for sheet and strip steel and provide necessary ingot, hot and cold rolling capacity to meet such demands.

#### TOOL COMPANY ORGANIZED

Organization of the Marion Tool Engineering Corp. has been announced by Julian Lett, head of the new firm in Marion, Indiana. The corporation plans to manufacture tools and dies chiefly for the automotive industry.

#### E. W. BLISS CO. MOVES

E. W. Bliss Company, manufacturers of metal stamping presses, has transformed its Cleveland, Ohio sales office from the N.B.C. Building to the Bliss manufacturing plant on E. 222nd Street, Euclid, Cleveland, it was announced today by Marshall M. Smith, company president.

The move was made possible by the addition of a new building which will enable the company to double its output at the Cleveland plant, and at the same time integrate its sales organization with plant operations for the purpose of providing improved service to customers.

#### KENNAMETAL ESTABLISHES NEW YORK OFFICE

Kennametal Inc., of Latrobe, Pa., announces the opening of its own Eastern District office at 6 West Broadway, New York City, for the distribution and servicing of Kennametal cutting tools and wear-resistant parts in eastern New York and northern New Jersey.

Standard tools and blanks will be

stocked for making prompt deliveries to plants in the area, and engineering service will be maintained.

The new office is in charge of L. D. Morton as Eastern District Manager, and J. G. Brady will serve as Representative.

#### OSCAR M. POLK: 1876-1947

The Sheffield Corp., Dayton 1, Ohio, with regret, announce the death of Oscar M. Polk, chairman of the board of directors of The Sheffield Corporation, on November 22. His passing was due to a heart attack and occurred two days before his seventy-first birthday.

Mr. Polk was a banker and civic leader of Dayton, Ohio, where he was born and spent his entire life. In 1914 he became associated with the City Machine and Tool Company, which later became the Cimatool Company. In 1933 he became interested in the Sheffield Machine and Tool Company of Dayton which was re-organized the following year as The Sheffield Gage Corporation with his son, Louis Polk, as vice president and general manager of both Sheffield and Cimatool. The two companies were merged to form The Sheffield Corporation in 1941, with Louis Polk as president.

#### SYNTRON OPENS BRANCH SALES OFFICE IN MONTREAL

D. G. Black, General Sales Manager of the Syntron Co. of Homer City, Pa., announces the establishment of a branch sales office in Montreal at 4695 Sherbrooke Street, West, under the supervision of Mr. C. F. A. Gray. This office will provide better sales and engineering service to meet the increased demand for Syntron Vibratory Material Handling and Construction and Maintenance Equipment in Quebec and the Maritime Provinces.



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# CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

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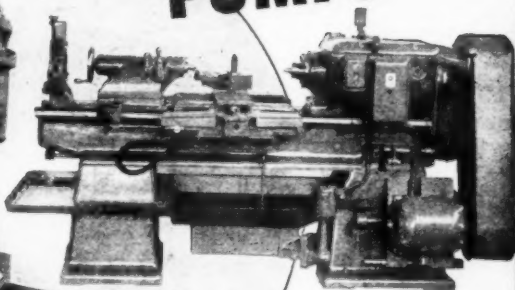
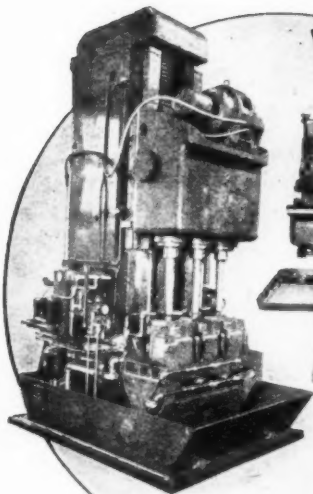
SEMI-OFFSET

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CHICAGO 19, ILL.

**SPECIFICATIONS:**  
Open Width  $\frac{1}{8}$ " to 6"  
Gage Material .040 to .125  
Pin Diameter .101 to  $\frac{3}{16}$   
Lengths to 120"

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**GREATER EFFICIENCY**  
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To the right is a 16" Lodge & Shipley Selective Head Engine Lathe equipped with a Model 2-P3 Long, 1/10 HP Gusher Coolant Pump.

To the left is a Baush Three-Spindle Vertical Boring Machine equipped with a Model 11025 Ruthman Gusher Coolant Pump.

Oversized pre-lubricated bearings requiring no further lubrication, electronically balanced, one-piece rigid shaft, no metal-to-metal contact gives greater efficiency in Ruthman Gusher Coolant Pumps. You are sure of years of trouble-free service at low maintenance cost when you specify Ruthman Gusher Coolant Pumps on your metal-cutting machinery.

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## THE RUTHMAN MACHINERY CO.

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# Appointments and Promotions

**Henry N. Muller, Jr.**, former manager of graduate student training, now becomes manager of the entire educational department of the Westinghouse Electric Corp., Pittsburgh, Pa. His former position will be taken by **Guy Kleis** who previously served as supervisor of engineering training.

**James F. Lincoln** announced today the appointment of **Thomas V. Koykka** to the Board of Directors of The Lincoln Electric Company, Cleveland 1, Ohio, to serve until the next annual election.

**Calvert Carey** of Greenwich, Conn., has been elected president, and **Fred Dunning** of Stamford, Conn., has been elected executive vice president of The Yale & Towne Manufacturing Company, N. Y. 17, N. Y.

Calvert Carey is the fifth president of the 79-year old company, succeeding the late **W. Gibson Carey, Jr.**, who died suddenly on October 4, as a result of a drowning accident in Florida.

**Mr. Horne** also announced that in addition to being executive vice president, **Mr. Dunning** will continue to serve as secretary and treasurer of the corporation.

Appointment of **William C. Madsen** as branch manager of the Gary, Indiana office of The Reliance Electric & Engineering Co., 1088 Ivanhoe Rd., Cleveland 10, Ohio, was announced by **R. O. Herbig**, central western district sales manager.

**George G. Raymond**, president Lyon-Raymond Corp., Greene, N. Y., announces the following promotions: **Geo. G. Raymond Jr.**, sales manager; **William L. Peck**, assistant sales manager; **Frank Forsberg**, factory manager; and **Seth Wiley**, purchasing agent.

**Hannifin Corporation**, 1101 S. Kilbourn Avenue, Chicago, Illinois, announces the appointment of **David G. Henderson**, P. O. Box 8002, Pittsburgh, Pennsylvania as sales engineer for the Hannifin line of hydraulic and pneumatic cylinders, presses, riveters, power units, and control valves in the Pittsburgh area.

The Timken Roller Bearing Company has announced the transfer of **William E. Bryden**, Sales Engineer, from the Chicago office to the Cincinnati office of the Timken Steel and Tube Division. He will be succeeded at Chicago by **William T. Strickland**, Sales Engineer.



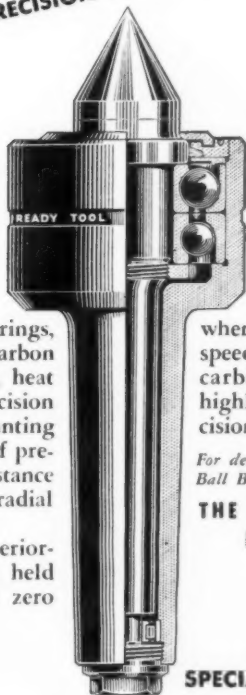
UNVEIL VAN NORMAN MURAL

The Van Norman Machine Tool Co., 3640 Main St., Springfield 7, Mass., celebrated the unveiling of the mural which they donated to the library of the Springfield Museum of Fine Arts. The mural symbolizes arts and the dance and the theater at the extreme left, the crafts, sculpture, painting and photography at left center and vocal and instrumental music at right center, all for the community—symbolized by the workmen at the far right.



MORE ACCURATE BALL BEARING CENTERS?

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DUPLEX BEARINGS MEAN  
TOP PRECISION BECAUSE . . .



. . . New Departure bearings, constructed of high carbon chrome steel, are forged, heat treated and finished to precision tolerances. Duplex mounting provides definite degree of pre-load . . . maximum resistance to deflection under heavy radial and thrust loads.

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when you work with the high speeds and feeds required for carbide cutting tools. Also highly recommended for, precision grinding.

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We also make Thrust Bearings interchangeable with other manufacturers.

*We take in extra work on  
Blanchard Grinders.*

**ACORN BEARING CO.**  
86 Stanley St. New Britain, Conn.

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Adapted  
for heavy  
duty work.  
Precision type  
ball and roller  
bearings assure  
maximum capac-  
ity for high speed  
production and long  
service.

**NIELSEN, INC.** LAWTON, MICH.

John S. Krauss, a pioneer developer of the V-belt industry has retired as manager of the L. H. Gilmer division of United States Rubber Company, Philadelphia, after 35 years of service. He will be succeeded by Lawrence K. Youse, former technical superintendent of the V-belt plant and recently assistant manager.

Samuel Koffsky, chief engineer of the Simmons Machine Tool Corporation, of Albany, N. Y., has been named general manager of the Simmons Fastener Corporation.

Mr. Koffsky will remain in charge of engineering of the parent company.

David D. Davis, vice-president of the Hy-Pro Tool Co., New Bedford, Mass., manufacturers of high speed steel commercial and precision ground taps, announces the appointment of Walter M. Boyden as sales manager.

As part of a long range expansion program, Phillips Manufacturing Co., Chicago, Ill., announces the appointment of A. Otto Miller as sales engineer for the state of Indiana.

E. T. Cuddeback, for the last year sales representative in the Allis-Chalmers Atlanta district office, has been named manager of the company's Tampa district office, according to an announcement by J. L. Singleton, vice president and director of sales of Allis-Chalmers general machinery division, Milwaukee, Wis.

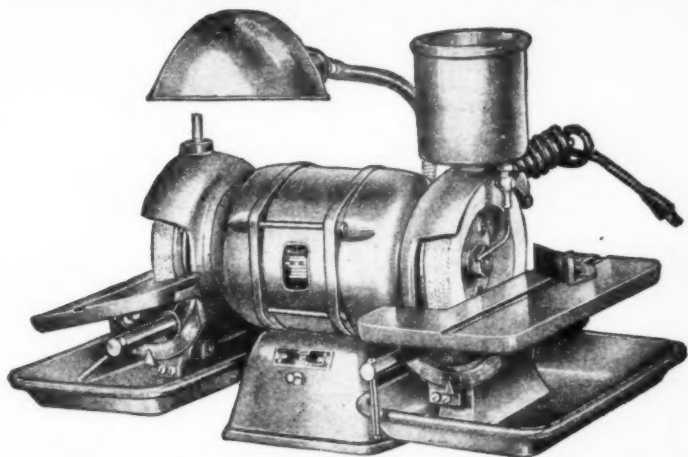
Cuddeback, holder of a bachelor of science degree in administrative engineering from Syracuse University, succeeds A. D. Robertson, resigned.

The appointment of Louis J. Bauld as chief engineer of the Bullard Company, machine tool plant at Bridgeport, Connecticut, has been announced by E. C. Bullard, president and general manager.

Mr. Bullard also announced the appointment of Robert W. Waring as assistant chief engineer and of Joseph C. Olson as head of the service and demonstration department.

Nat J. Weiss has announced that he will devote his entire efforts to the Nat J. Weiss Sales Associates and the American Industrial Equipment Corp., of which he has been president for five years. Both organizations will operate from 116-49th St., Union City, N. J.

# *Special* **CARBIDE TOOL GRINDER**

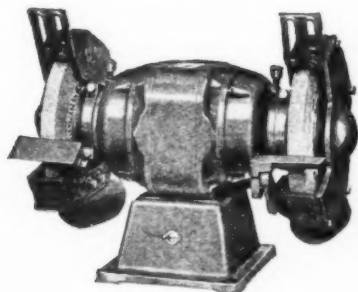


## **FOR QUICKLY AND ACCURATELY SHARPENING CARBIDE TOOLS**

BALDOR GRINDER, series 500, (shown above) is the newest development in grinders designed and fully equipped for sharpening Carbide Tools quickly and accurately; has sturdy  $\frac{1}{2}$  H.P., reversible, ball-bearing motor. 6" Silicon Carbide wheels; adjustable tool-rest tables, water pot. Complete as illustrated and GUARANTEED 2 YEARS against burn-out.

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AT LEFT: BALDOR Bench Grinder, No. 101.  $1\frac{1}{2}$  H.P., ball-bearing motor; 1725 rpm; 10" Aloxite wheels; adjustable tool rests.

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4358 Duncan Ave., ST. LOUIS 10, MO.

District Offices in Principal Cities

**BALDOR**  
**BALL BEARING GRINDERS**

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# Available LITERATURE

## **PRECISION BORING MACHINE**

Construction features in photographs and description. Dimensions. A few possible setups illustrated. Specifications. **Ex-Cell-O Corp., Dept. BB, 1200 Oakman Blvd., Detroit, Mich.**

## **HARDNESS TESTER**

Describes capabilities, operation and equipment, and includes conversion chart. Describes tester for testing materials 1/64" thick or less, and a 4" model which tests rounds and flats up to 4" and 2" in from edge of sheet stock. 12 pages. **Ames Precision Machine works, Dept. BB, Waltham 54, Mass.**

## **MILLING MACHINE**

**Plain Automatic.** Pictures and description of machines in the field and examples of tooling, three-quarter front views of machine, list of 18 features and specifications including operating controls, general specifications, equipment, dimensional drawing and electrical specifications. 23 pages. **The Cincinnati Milling Machine Co., Dept. BB, Cincinnati 9, Ohio.**

## **MILLING MACHINE**

**Vertical.** Highlights of design, machine description, index to operating controls and construction details, specifications and applications in the field. 15 pages. **The Cincinnati Milling Machine Co., Dept. BB, Cincinnati 9, Ohio.**

## **GRINDING MACHINE**

**Centerless.** Features of design, index to operating controls and construction details, general specifications, standard equipment supplied with the machine, electrical equipment, accessories and attachments. 15 pages. **Cincinnati Grinders, Inc., Dept. BB, Cincinnati 9, Ohio.**

## **GRINDING MACHINES**

**Plain Hydraulic, 6" and 10"-L.** Highlights of design, description of machine, specifications and line drawings. Illustrations. 19 pages. **Cincinnati Grinders, Inc., Dept. BB, Cincinnati 9, Ohio.**

## **DRILLS**

Specifications, illustrations and descriptions for sliding head floor drill, floor drills with single and multiple spindles, bench drill, radial drill. Well illustrated. 15 pages. **Canedy-Otto Mfg. Co., Dept. BB, Chicago Heights, Ill.**

## **COMPARATOR SCREENS**

Photographs, descriptions and prices of types of standardized screens which can be supplied to customers promptly. Two types of screens are available in five different sizes. 28 pages. **Jones & Lamson Machine Co., Dept. BB, Springfield, Vt.**

## **BAR MACHINES**

**Automatic, 4-6 and 8 spindle.** Features such as permanent alignment of tools with work, spindle carrier indexing, stock reel power indexed independently, side slides independently operated, gear box section, lubrication and safety. Indexed 2-page spread of construction features. Standard and special attachments. Specifications. **National Acme Co., Dept. BB, 170 E. 131st St., Cleveland 8, Ohio.**

## **LATHES**

Illustrates in color and describes 13-inch swing Quick Change Gear and Toolroom Lathes. Attachments and accessories are also shown. 8 pages. **South Bend Lathe Works, Dept. BB, 425 E. Madison St., South Bend 22, Ind.**

## **CEMENTED CARBIDE PRODUCTS**

Covers clamped-in solid round tools, tools with clamped-in blades, internal radius tools and blanks, milling cutters, saws, drills for masonry, etc. 64 pages. **Kennametal, Inc., Dept. BB, Latrobe, Pa.**

## **PRECISION FACING MACHINES**

Describes fixtures, construction, table, bridges, spindles and chip disposal and coolant system. Details specifications. 4 pages. **Ex-Cell-O Corp., Dept. BB, 1200 Oakman Blvd., Detroit, Mich.**

#### WELDING MACHINE

Electronic Automatic. Pictures and description explains process, welding in either direction, high jobs and low jobs. Capacity and terms. 11 pages. Niagara Machine & Tool Works, Dept. BB, 637-697 Northland Ave., Buffalo 11, N. Y.

#### GRINDING MACHINES

Correct and incorrect methods of mounting grinding wheels on portable machines; means of avoiding wheel breakage; "high-speed" and "low-speed" machines; protective devices and methods; tables for conversion of r. p. m. to s. f. p. m. for wheels 1 to 8 inches in diameter. 20 pages. Grinding Wheel Mfrs. Assoc., Dept. BB, 27 Elm St., Worcester 8, Mass.

#### FORGED NUTS

For large construction and for heavy machinery and equipment. Covers types fabricated, and method of threading, employing modern hob milling equipment. Illustrations and cross section showing threads, also classifications. 4 pages. Jos. Dyson & Sons, Inc., Dept. BB, 5125 St. Clair Ave., Cleveland 14, Ohio.

#### SLUSH PUMP

Eight photographs, a blueprint, performance chart and specifications. Features covered are valves and seats, rock shaft stand, steam end, and liners, pistons and rods. 16 pages. The National Supply Co., Dept. BB, Box 899 A, Toledo 1, Ohio.

#### RIG TYPE 125

For drilling of oil wells to 15,000 feet. 17 photographs. Describes features of the rig, complete operating, lubrication and draw works specifications, a shaft speed diagram and two dimensional drawings of 3- and 4-engine power groups. 20 pages. The National Supply Co., Dept. 899A, Toledo, O.

#### LATHE, AUTOMATIC

Pictures and description of turning jobs. Describes speeds and feeds, available cycles—front carriage and rear slide—, special features and specifications, dimensions and shipping data. 8 pages. Sundstrand Machine Tool Co., Dept. BB, 2531 Eleventh St., Rockford, Ill.

#### CONNECTOR

Rubber clad electrical. Gives list of applications and features. 2 pages. Industrial Power & Equipment Co., Dept. BB, 406 Millbridge St., Pittsburgh 10, Pa.

### MADE OF ALLOY STEEL MILLED FROM BAR

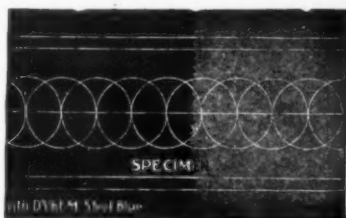
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## COUNTRY GAGES

Contains story of tie-in with American Petroleum Institute's Standardization Program and describes A.P.I. rotary tool joint, cable drilling tool joint, casing, drill pipe, tubing, gages, etc. 16 pages. Pratt & Whitney, Dept. BB, W. Hartford 1, Conn.

## DEBURRING AND FINISHING

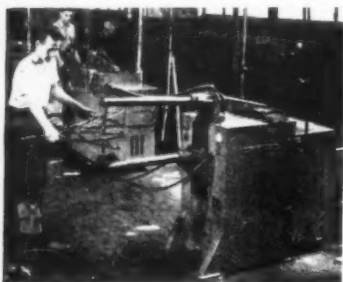
Adaptable for metal stampings, switch parts, condenser plates, hardware items, metal parts up to three inches in diameter, metal parts with simple or plain outside surfaces. Pictures of pebbles used, description of actual operation, comparison of costs and list of short cuts. 9 pages. Minnesota Mining & Mfg. Co., Dept. BB, 900 Fauquier Ave., St. Paul 6, Minn.

## UNIVERSAL FIXTURES

Lists 10 ways to use precision boring universal fixtures. Specifications and description of operation. 4 pages. Ex-Cell-O Corp., Dept. BB, Detroit, Mich.

## PRECISION WAY MACHINES

Describes multiple operations in one set-up. Pictures of machines and examples of parts machined. Applications described by pictures and description. Specifications. 8 pages. Ex-Cell-O Corp., Dept. BB, 1200 Oakman Blvd., Detroit, Mich.



## RESISTANCE WELDING FAN GUARDS.

Westinghouse non-synchronous electronic controls mounted on the rear of standard rocker arm welders time and sequence each weld. Functions of squeeze, weld, hold, and off are calibrated in cycles. Each can be set for the job at hand by adjustment dials on the cabinet door.

## OIL CIRCUIT BREAKERS

Outline of structural parts, and extra protection features listed. Explains electrical and manual operation and accessories. Line drawing depicting general dimensions, table of maximum current, voltage and interrupting capacity ratings. 4 pages. Allis-Chalmers Mfg. Co., Dept. BB, Milwaukee, Wis.

## EXPANDING MANDRELS

For turning, grinding or milling. Specifications and features outlined. Pictures in use. Catalog Sheet. K. O. Lee Co., Dept. BB, Aberdeen, S. D.

## ELECTRICAL TOOLS

Specifications, pictures, and description of drills, drill stands, hole saws, grinders, buffers, and polishers, shaft equipment. 32 pages. The Bradford Machine Tool Co., Dept. BB, Cincinnati, Ohio.

## DIE FEEDS

Features and Specifications of 3" and 6" die feeds. Pictures of typical feed applications and discussion of operating principles. 8 pages. H. E. Dickerman Mfg. Co., Dept. BB, 321 Albany St., Springfield, Mass.

## HITCH FEEDS

Features and specifications of 2" and 4" hitch feed. Operating principles detailing gripping and feeding action and typical feed applications. 8 pages. H. E. Dickerman Mfg. Co., Dept. BB, 321 Albany St., Springfield, Mass.

## TOOL AND CUTTER GRINDERS

Pictures and description of grinding hob, double angle cutter, end mills, etc. Discusses precision grinding for tungsten carbide. Lists highlights, specifications and extras available. 12 pages. Oliver Instrument Co., Dept. BB, Adrian, Mich.

## CHUCKING MACHINE

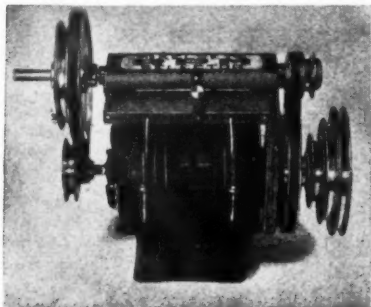
Pictures and description cover features and possible operations of chamfering, forming, facing, boring, turning, drilling. Operating Cycle discussed. Dimensional chart and specifications included. 11 pages. The National Acme Co., Dept. BB, Cleveland, Ohio.

## MARINE DIESEL ENGINES

Describes research laboratory, manufacturing process, lubrication system, fuel system and various parts. Blueprints of various models. Page of horsepower ratings and standard equipment. 27 pages. Superior Engine Divn. of The National Supply Co., Dept. BB, Springfield, Ohio.

### SPINDLE SPEED SELECTOR EMBRACES WIDE RANGE

McKelvey's R.P.M. Selector, a new unit that attaches to and becomes a part of the average electric motor on drill presses, lathes, and conventional power tools, permits a complete selection of leaving the motor speeds from a low of 66 r.p.m. to a high of better than 10,000 r.p.m. This, when applied to the conventional power tool, will give that equipment spindle speeds ranging from 20 r.p.m. low to a high of three times the leaving the motor speeds.



The equipment of the Selector consists of three 6", two 5", one 3½", three 2" pulleys; one 3" and one 1¼-inch step pulley and three special splines, a counter shaft assembly, a motor mount, and three high quality belts.

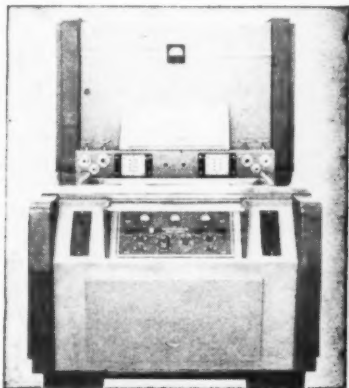
The motor mount and countershaft assembly attach to the motor housing, with no drilling or tapping required. On each end of the selector shaft is a special spline which is permanently attached. The selector shaft drives an idler spline, equipped with special bearings, which in turn drives the power tool. Snap ball retainers on the splines permit the speed selection desired by the operator when pulley changes are necessary. On the average drill press or lathe with the standard accessories and belts of the selector, 120 different spindle speeds may be obtained ranging from 20 r.p.m. to a high of 10,000 r.p.m.

For complete information on the McKelvey Selector, write:

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### THREE NEW RF GENERATORS FOR METALWORKING ANNOUNCED

Designed specifically to meet the demands of the metalworking industry, three new 20 kw 450 kc radio frequency generators now being built by Westinghouse consolidate generator, worktable or sink, current transformers and water fittings into one easily installed, simple to operate unit requiring minimum floor space. The three generators are 1) Type A, a single position unit with built-in worktable and transite table top especially suited to brazing and soldering. 2) Type B, a single position unit for hardening applications with a built-in work sink, two sets of water fittings and a



current transformer, and 3) Type C, illustrated, two position unit suited to many soldering, brazing, and hardening applications that combines a built-in work sink, two sets of coil and quench water fittings, and two current transformers with automatic transfer switch to provide two independently controlled work positions.

Stepless power output control from 0 to 20 kw provides unusual operating flexibility in the new generators and insures uniform performance on repetitive setups.

Further information may be obtained upon request to:

Westinghouse Industrial Electronics  
Div., Plant No. 4, Dept. BB  
Baltimore, Md.



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We also make silent gears of rawhide and Fabrolite.

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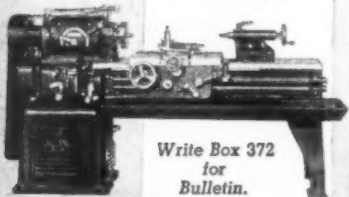
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12 Speed Geared  
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Timken Mounted  
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Modern Design—  
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Dimensions



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MACHINE TOOL CO.**

SATAVIA OHIO, U. S. A.

## DRILLING AND TAPPING MACHINES AND INDEXING TABLE

Describes 3 series 125 units together with photographs and specifications. Includes many operational views of various head positions. 22 pages. **Kaukauna Machine Corp., Dept. BB, Kaukauna, Wis.**

## ROTARY GEAR PUMP

Description with specifications and pictures. 5 pages of indexed drawings together with instructions for ordering and capacity of each type of pump. 9 pages. **John S. Barnes Corp., Dept. BB, Rockford, Ill.**

## PROCESS PUMPS

Indexed illustration and explanation of parts. Dimensions. Range diagram approximating the Head-Capacity Range of process pump. Features. 4 pages. **Allis-Chalmers Mfg. Co., Dept. BB, Milwaukee, Wis.**

## RIGIDMIL

Features, spindle speeds, table feeds, table cycles, attachments, spindle nose data, foundation plans, dimensions and shipping weight. Description of engineered production service. 8 pages. **Sundstrand Machine Tool Co., Dept. BB, 2531 Eleventh St., Rockford, Ill.**

## STEEL RULE DIE METHOD

For power presses. Lists advantages, machinery requirements, preparation for die cutting, make ready, types of material that can be cut. Folder. **Accurate Steel Rule Die Mfrs., Dept. BB, 24-26 W. 21st St., N. Y., N. Y.**

## MILLS, MIDGET

Specifications, illustrations, prices, cemented carbide midget mills, cuts available, inside deburring cutters, outside chamfering mills, tube deburring cutters, nose drills, reamers and files. 28 pages. **Severance Tool Industries, Inc., Dept. BB, Saginaw, Michigan.**

## FIXTURE CLAMPS AND COMPONENTS

Price list. Tracing templates included of knob clamp assembly nut clamp assembly, cam clamp assembly, standard eye bolts, washers, etc. 38 pages. **Morton Machine Works, Dept. BB, 2421 Wolcott St., Ferndale 20, Mich.**

## BAR FEED ATTACHMENT

Features of Hy-Level Bar Feed Attachment. Cross-sectional view explains why method limits losses in bar lengths. Explains 6 benefits. 4 pages. **Hy-Level Screw Products Co., Dept. BB, 2114 W. Superior Ave., Cleveland 13, Ohio.**



### SNAP GAGE

Details operation and construction features. Pictures show use. Gaging Range Chart and samples of meter scales included. 4 pages. Pratt & Whitney, Dept. BB, W. Hartford 1, Conn.

### MILLING MACHINE

Tracer-controlled — Keller. Describes range of work, principles of operation, construction details—lead screw drives, spindle drive, power limiting relay—, special equipment and attachments, —precision locating attachment, interrupted profiling and boring feed, combination tracer, depth model and profile template—, specifications. Pratt & Whitney, Dept. BB, W. Hartford 1, Conn.

### ANALYSIS OF MEASUREMENTS

Functional analysis and classification of measurement systems and outline of historical development. Uses of functional analysis method including applications to research problems, compilation of data, and coordination and standardization activities. 19 diagrams give cross-section of measurement elements and full page chart depicts frequency of occurrence of basic elements. 28 pages. General Electric Co., Dept. BB, Schenectady, N. Y.

### AUTOMATIC

Screw machines, chucking machines, precision boring machines and turret lathes. Description of each with specifications and picture. 10 pages. The New Britain Machine Co., Dept. BB, New Britain, Conn.

### STOCK GEAR AND SPROCKETS

Catalog covers complete lines, terms, specifications and price. Engineering data on standard keyways and set screws, reborings hubs, circular and diametral pitch, strength of gear teeth. 128 pages. American Gear & Mfg. Co., Dept. BB, 5900 Ogden Ave., Chicago 50, Ill.

### ELECTRONIC CONTROLS

Measuring and Control Systems; the "Electronic Control Principle"; Multironic Proportioning, Automatic Positioning and Program Control are explained with graphs, diagrams and photographs. Millivoltmeter, Potentiometer and Resistance Thermometer Controllers, Indicating Pyrometers and Resistance Thermometers, Input Controllers, etc. are shown. 20 pages. Wheelco Instruments Co., Dept. BB, 847 W. Harrison St., Chicago 7, Ill.

# famco machines

COST  
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### ARBOR PRESSES

Famco arbor presses are available in 32 stock models for floor or bench mounting . . . feature exclusive adjustable gib for front and side ram adjustment. Average less than 2c a year per press for maintenance cost!

### FOOT PRESSES

Savings multiply on light punching and forming jobs with the use of any one of the 10 Famco foot press models. They may be bench or floor mounted.

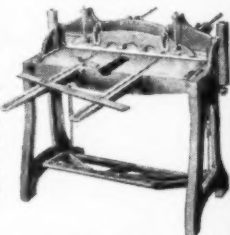


### PUNCH PRESSES

Newest of the Famco family, these power operated, open-back, inclinable punch presses are available in bench or floor models. Have semi-steel cast iron frames; solid, forged, precision-ground crank-shafts. With or without motor.

### SQUARING SHEARS

Famco foot-operated shears do precision shearing of up to 18 gauge mild steel. Come in 5 cutting widths (22" to 52") . . . have easy-to-set gauges.



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## FAMCO MACHINE CO.

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# ABRASIVE No. 5AWF INTERNAL FINISHER

## A NEW CARBIDE FINISHING MACHINE

The increasing use of carbides and similar materials for dies, gages, bushings, etc., has created an urgent need for an accurate machine to grind and finish such materials rapidly. The ABRASIVE MACHINE TOOL COMPANY, long an outstanding manufacturer of precision surface grinding machines, now presents the No. 5 AWF INTERNAL FINISHER, manufactured and sold under the Walter G. Wessman patents. This accurate machine, quickly set up for internal or external work, is capable of grinding and micro-finishing at one chucking several angles or combinations of straight and angular surfaces. The grinding action differs from previous methods in that surfaces are ground with a wide section of the wheel, utilizing a grinding action "across the work surface".

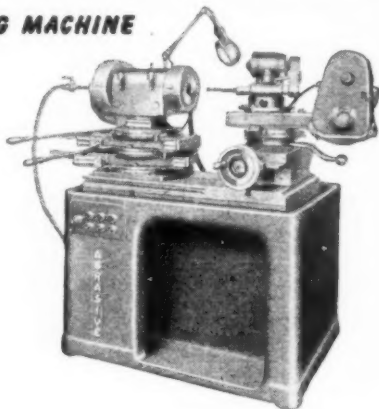
### RECIPROCATING SLIDE

The finishing of carbides heretofore has been slow and hazardous due to the uncertain action of the grinding wheel. Now ABRASIVE makes available a patented reciprocating feature built into the wheel slide which causes the "hills" between the "valleys" to be eliminated, giving a much smoother finish and faster production. The increase in cutting speed is due to the tendency of the grains, under reciprocation, to wear thin and stay sharp. The reciprocating action puts more of the grains of the abrasive to work and prevents gauging by the wheel. Both the speed and length of reciprocation are adjustable for maximum efficiency.

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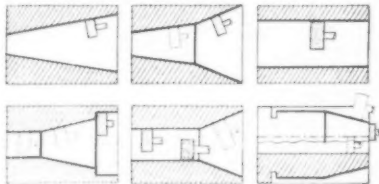
**ABRASIVE MACHINE TOOL CO.**

EAST PROVIDENCE 14, RHODE ISLAND, U. S. A.



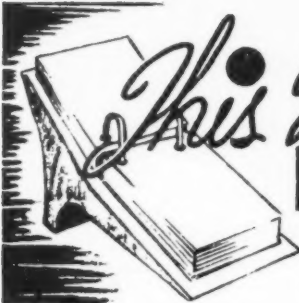
### MULTIPLE ANGLE GRINDING ACCOMPLISHED IN ONE SET UP

The sketches show typical grinding operations performed at one setting of the ABRASIVE No. 5 AWF INTERNAL FINISHER. The unusual cutting action provided by the fast reciprocating wheel slide produces a microinch smoothness of 2 RMS or better without lapping, honing, or polishing.



**ABRASIVE**

**ACCURACY BOOSTS PRODUCTION**



# This Month's INDUSTRIAL FILMS

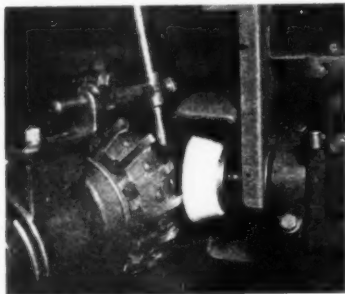
## CUTTER SHARPENING

Norton Company  
Worcester 6, Mass.

*14 minutes. Kodachrome. Sound. 16 mm. Obtainable from the Norton Company.*

Briefly, this film concerns setting up and sharpening milling cutters, reamers and other commonly used tools.

A typical tool and cutter grinding machine is first demonstrated so that the operator may become thoroughly familiar with its operation and its versatility.



Then the picture shows, step by step, the operations of grinding some of the more commonly used types of cutters. Each scene is a close-up and no operation is omitted in setting up and sharpening.

This film will be helpful in teaching

the principles of tool room grinding and emphasizes the exacting care taken by a skillful and experienced operator. It is designed to impress upon the mind of the operator the importance of his grinding job and the part that sharp tools and cutters have in obtaining maximum industrial output.

Films are loaned without charge with the understanding that they will be handled and projected by experienced operators with dependable equipment and returned in good condition, express prepaid. They are shipped from Worcester express prepaid.

• • •

## THIS IS RESISTANCE WELDING

General Electric Co.  
Schenectady, N. Y.

*30 minutes. Color. Sound. 16 mm. Obtainable from G-E offices throughout the country, electric utilities and welder manufacturers.*

The movie is part of General Electric's More power to America program. Produced by the Raphael G. Wolff Studios Hollywood, under the technical supervision of the G-E welding laboratories, the film emphasizes throughout the important role resistance welding is playing in the high-speed, quantity production of innumerable products in a wide variety of sizes, shapes and materials.

Following a colorful introduction in which a striking parallel is drawn between modern resistance welding technique and the primitive heat-and-pressure

sure method of the village blacksmith of old, the movie opens with a detailed explanation of the operating principles of resistance welding generally. Animated drawings and clear close-ups show how



the pieces of metal to be welded are held between the electrodes of the welding machine while carefully timed, low-voltage, high amperage direct-current or

alternating-current fuses them together.

The remainder of the movie is devoted to many typical examples of how electronically controlled resistance welding is cutting costs, increasing production, opening new fields of employment, and progressing to new realizations of industrial achievement.

• • •

#### DESIGNING CARBOLOY TOOLS

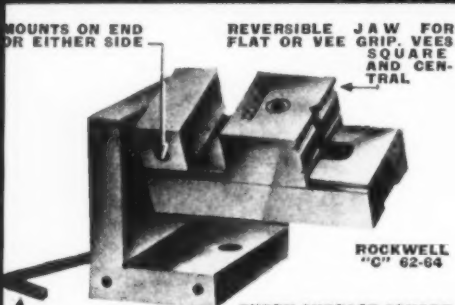
Carboloy Company, Inc.  
Detroit, Mich.

45 minutes. Slide films. 35 mm. film strips. Obtainable from Carboloy Company or college lending library (list furnished on request).

"From an application standpoint, more than 75% of the tools in use today are single-point tools," furnishes the theme for "Designing Carboloy Tools." The whole film is based upon the importance of single-point tools from the standpoint

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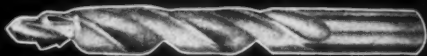
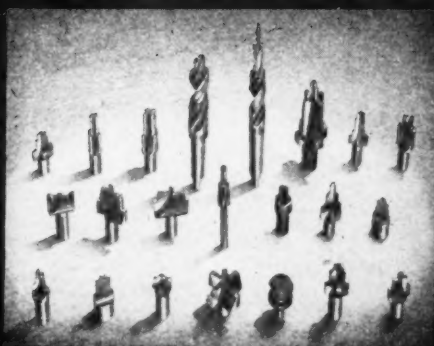
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of application and design. Certain things must be determined before the tool can



be designed, e.g., the style of tool (straight, offset, etc.); the size of the shank; the tip needed; and the correct tool shape (angles). The film discusses each of these points and gives a step-by-step discussion of the purpose of each.

This is one of a series of six slide films covering fundamentals of carbide tool manufacture, design, application and maintenance. Each view contains a complete descriptive caption which makes for an excellent educational medium, because any view may be held on the screen as long as desired for discussion.

Films are suitable for use by industry, vocational schools, or governmental training projects for training individuals engaged in or about to enter the metal working field.

Carboloy furnished the films at approximate print cost and they are also available for loan through film libraries maintained by colleges in many states. Carboloy will furnish a list of such libraries on request.

• • •

#### GAGE, ELECTROLIMIT HEIGHT

Details of use, construction and description and specifications. Pictures in use. Samples of meter scales. 4 pages. Pratt & Whitney, Dept. BB, W. Hartford 1, Conn.

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The Platen increases capacity of the unit. Vise and Platen are interchangeable.



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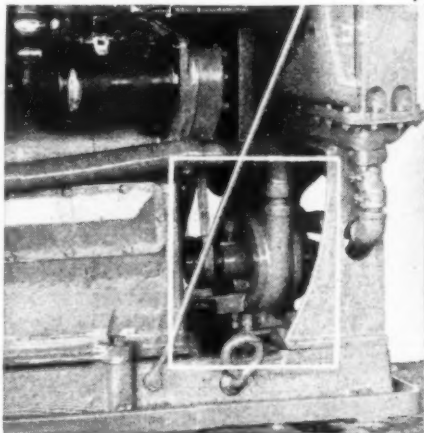
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# Shop Hints

## **TUMBLING BARRELS DEMONSTRATE VERSATILITY**

by John E. Hylar

Various types of tumbling barrels in use constitute an interesting study, for a number of things are accomplished by the tumbling process. In many cases, it is easy to determine, by trial, just how long a charge of work of a given type should be tumbled for best results. Where a given barrel or drum is used for the same kind of work all the time, an interval timer is often used. These timers are adjustable, however, for various time intervals, so that different-length runs may be controlled through the same timer.

On the other hand, there are some tumbling barrel operations where it is found necessary or desirable to reverse the direction of barrel rotation continuously. For this purpose, reversing timers are usually applied. These are also adjustable, both with regard to the number of reversals per minute, and to the proportionate length of the "off" period between reversals. The latter is adjustable to anywhere from zero to 40% of the complete time cycle, on at least one timer of this type.

Burnishing barrels are available in a number of sizes, depending on the type and quantity of work to be handled. Balls, cones, and various other types of burnishing materials are run in these barrels with the work. The larger the barrel, the greater the amount of burnishing materials that will be run. Manufacturers of burnishing barrels also provide various kinds of special tumbling barrels. Horizontal wood-lined barrels, of considerable length, are used for tumbling longer items, as for instance curtain rods. These are usually oscillating barrels.

Cutting-down barrels are designed for running abrasive with the work, in order

to remove burrs, and produce a smooth surface. In some cases, "work-holding" barrels are employed. Naturally, all tumbling barrels really hold the work, but the sense of the term here is that the workpieces are fastened on fixture plates, inside of the barrel, while the processing material is tumbled around them, thus drawing them through the burnishing mass. This is an especially fine provision for workpieces that are sufficiently fragile to damage themselves, if tumbled in the ordinary manner.

## **ELECTRIC FURNACES COPPER BRAZE REFRIGERATOR EVAPORATORS**

Two new G-E 320-kw roller hearth electric brazing furnaces are further streamlining an efficient production line at the North Chicago Division of the Houdaille-Hershey Corporation. These furnaces are used with three older G-E furnaces to copper braze refrigerator evaporators.

One operator at each furnace easily handles the conversion of stamped, sheet steel plates into brazed sections, later to become evaporators. Brazing begins after the operator has placed a copper strip between two steel stampings, has loaded the material on a heat-resisting alloy rack, and has pushed the rack over rollers toward an automatically-controlled door on the charge end of the furnace. The door, 35 in. wide, opens vertically 13 in. The heating chamber, extending 17 ft, brazes the pieces together at 2050 F.

From the furnace chamber the rollers convey the brazed parts through a 70-ft cooling chamber. The discharge door of the chamber opens automatically to permit them to roll out to a specially-designed conveying system that Houdaille-Hershey has installed for use with the furnaces.

The racks leave the cooling chamber and are guided by the furnace rollers to a conveyor of the endless chain type

which carries them to a roller conveyor extending along the center aisle of the building. The rollers carry them back to the charge end of the furnace, where the conveyor again becomes an endless chain. There the racks are unloaded by the furnace operator.

After being brazed, the parts are carried on fork trucks to be baked, chemically treated, soldered, and formed into the final evaporators.

The North Chicago Division also makes air cleaners, brake levers, and other automotive parts.

## HOW TO SET UP VISUAL METHOD CONTROL BOARD

By

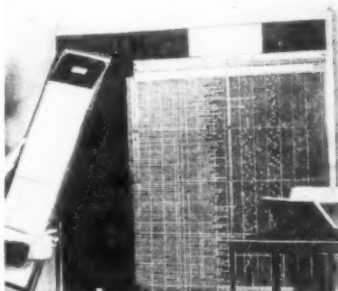
John A. Howland

In order to determine the status of shop orders, the visual methods form of control could be used with efficiency in many shops. It provides an up-to-the-minute picture of conditions at any moment it is consulted. The visual control system is extremely simple, and can be operated by an intelligent routine office worker.

A visible index is located at the left

side of the board. It is used to hold the permanent card records of the items or elements under control. In each index there are 100 card pockets. A legend is located at the top of the board itself and shows the meaning of the pegs and cords.

A peg hole section is placed on the



main body of the board—for visible analysis of information on the cards. Peg holes from left to right may represent quantity and/or time. There is one tape peg for each item in the visible record index, and each is numbered to correspond with the card pocket (at its left). Each peg is attached to a cord which pulls outward from the board so that it may be extended from left to right on the board as needed.

The signal pegs are to be located, according to procedure, in the various peg holes, their meaning being noted on the legend at the top of the board. The "today line" is attached vertically to the board and moved periodically from left to right in accordance with the time element in the procedure.

## GAGE VISE

Specifications and price. Accurate to within .0003 of an inch on five sides, readily attaches to sine plates. 2 pages. The Erickson Steel Co., Dept. BB, 2309 Hamilton Ave., Cleveland 14, Ohio.

## COLLET CHUCKS AND HOLDING TOOLS

Describes collet chucks, precision tap chucks, expanding mandrel, floating holders, and air operated speed chuck. Folder. Erickson Tools, Dept. BB, 2309 Hamilton Ave., Cleveland 14, Ohio.

## STERLING DRILL GRINDER



### CAPACITY:

$\frac{3}{8}$ " to 2 $\frac{1}{2}$ " drills.

5" x 9" adjustable table.

MOTOR:  $\frac{1}{2}$  hp,  
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NET WT: 250 lbs.

CRATED: 320 lbs.

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The Bendmore handles material up to 3/32" thick a full 12" wide. Good clean bends up to 135°. The machine is ruggedly constructed of semi-steel castings, the operating cam and steel insert in ram are heat treated to resist wear and give long life. Prompt delivery.

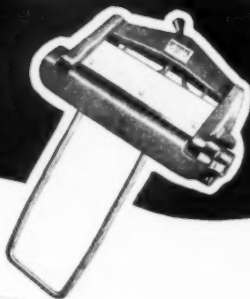
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# NEW TECHNICAL BOOKS

## CONFERENCE GUIDE TO BASIC MANAGEMENT TRAINING

By Arthur S. Hotchkiss. Published by The National Foremen's Institute, Inc., Deep River, Conn. 1947. 196 pages. \$5.50.

This book offers management a realistic training approach to the orientation of supervisors into the management fold. The manual is intended to serve as a guide to directed conference subjects, and with this objective in mind, the material is broken down into sessions dealing with ten phases of supervisory training.

The first of these sessions develops the idea that the supervisor is in the management circle. The second defines a supervisor and his relationship to men, materials and machines. The third clarifies the delegation of responsibility and explains policies and procedures as guiding rules to meet supervisory responsibility. The fourth session points out the responsibility of the supervisor regarding collective bargaining, explains the National Labor Relations Act and the National Labor Relations Board and gives basic understanding of labor agreements.

The fifth, sixth and seventh sessions apply labor agreement details to respective operations. The eighth reviews the Job Relations Training program. The ninth explains interviewing and the tenth examines the question of discipline.

Full directions for the presentation of each session are included, and diagrams, charts and pictures are presented where needed. The program should be considered as a suggestive outline to aid in the development of a basic management training program.

## THEORY OF LIMIT DESIGN

By J. A. Van den Broek, professor of Engineering Mechanics at the University of Michigan. Published by John Wiley & Sons, Inc., 440 Fourth Ave., N. Y. 16, N. Y. 1948. 144 pages. \$3.50.

Limit design theory, which is attracting increasing attention among engineers and students of mechanics, is essentially an attempt to supplement, and in large measure replace, elastic stress distribution as a criterion of strength of redundant structures. Dr. Van den Broek, who has spent forty years in personal investigation of the problem, believes that elastic stress never was, in reality, nor is it now, a criterion of strength. In "Theory of Limit Design," he presents, clearly and logically, the fundamental principles which constitute a basis for the belief that ductile stress distribution, rather than elastic stress analysis, is more properly synonymous with theory of strength. Carefully developing his arguments, the author has coordinated the simple criteria upon which limit design is based into an acceptable theory for design of redundant structures.

Chapter headings include Physical Properties of Metals, Limit Design of Simple Structures, Limit Design of Redundant Beams, Limit Design of Trusses, Connection Details, Evaluation of Limit Design.

An interesting feature of the book is its extensive treatment of column action. The author makes use of problems, formulae, and examples to clarify the discussion. This is a significant contribution to engineering literature.

## SHOT PEENING

*Published by American Wheelabrator & Equipment Corp., Mishawaka, Indiana. Third edition. 181 pages. \$1.50. (Free to executives who request on company letterhead).*

This edition contains all of the information included in the earlier editions, plus the addition of comprehensive papers on the subject by Mr. J. O. Almen of General Motors Research Laboratories and Mr. O. J. Horger of Timken Roller Bearing Co.

Mr. Horger's article presents a review of the history of shot peening and a study of literature on the subject as well as much original work by the author. Mr. Almen's paper discusses the use of shot peening for improving the fatigue strength of machine parts and devotes considerable space to a study of the theory of fatigue failures.

The first portion of the book remains essentially the same as the second edition and is devoted to a study of the practical application of shot peening, with particular emphasis given to the methods of handling the work and controlling the quality of the operation. The second part of the book, written by Professor H. F. Moore of the University of Illinois, discusses in considerable detail the theory of fatigue and how it is affected by shot peening.

## GRINDING MACHINERY AND WHEELS

Information on horizontal face, vertical surface, knife and floor stand grinders, buffing lathes, cut-off machines, cutler grinders, grinding wheels. 15 pages. The Bridgeport Safety Emery Wheel Co., Inc., Dept. BB, Bridgeport, Conn.

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## DORMAN Tappers

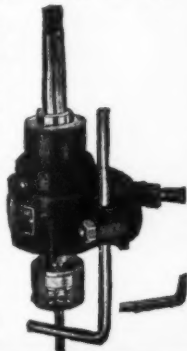
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2-56 to 1¼"

Single adjustment changes from light friction to positive drive or intermediate, to prevent tap breakage. No. 1 tapper, friction or positive, drives 2-56 to ¾" tap in steel or any other material.

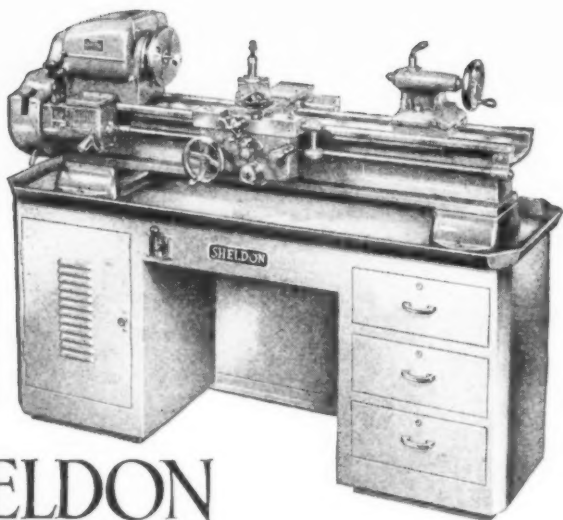
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### *Why wear out big equipment on little jobs . . .*

It costs money to operate big lathes—ties up costly equipment, takes more expensive tooling, more power, more floor space, requires a more experienced operator. It's just good business to have smaller, handier, faster lathes like the SHELDON T-S56 for much of your work, and save the difference in operating cost.

The SHELDON T-S56 Precision Lathe has 11¼" Swing, 1" Collet Capacity (large 1¾" hole thru spindle) and is made permanently accurate with Zero Precision taper roller bearings.

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## SHELDON MACHINE CO. Inc.

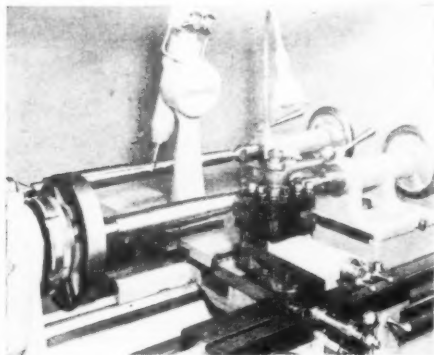
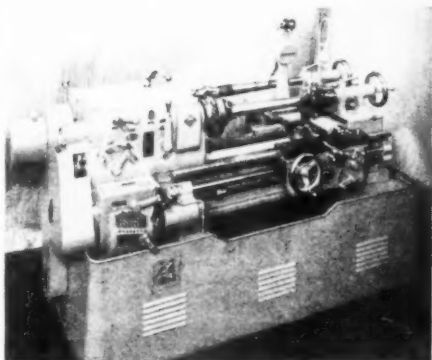
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## CONTOURMATIC and TRACERMATIC CINTILATHES

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The Contourmatic is a standard engine lathe to which has been added a simplified tracing attachment which synchronizes the in and out movements of the cross slide with the longitudinal movement of the carriage to accurately duplicate the contour of a master template. The master template does not rotate and may be a turned work piece or a flat template. The tracer will follow the profile of the master in either feed direction of the carriage on both external work. Light contact pressure of the tracer finger permits the use of wood, plastic or other easily constructed master profile shapes.



This equipment will efficiently and accurately produce work of a circular cross section such as multiple diameter shafts or similar parts which may incorporate grinding necks, tapers in both directions, shoulders, or irregular contours along the axis. Accurate duplication of the master profile template unaffected by the variations normally incurred with operator controlled machines is assured.

A unique feature which increases the versatility and permits the facing of sharp shoulders accurately and safely is in the addition of an hydraulically operated clutch and brake mechanism which is interposed between the standard gear box and the feed shaft, which provides the power feed to the carriage.

This mechanism is controlled by the tracer so that sudden changes in contour of the master, such as a shoulder on the multi-diameter shaft, cause excessive deflection of the tracer, which disengages the drive to the feed shaft, thereby stopping the longitudinal movement of the carriage. In such a case the cross slide feeds out at a maximum feed rate which is determined by the setting of a rate valve, until the tracer clears the shoulder of the master, then the longitudinal movement of carriage is resumed.

The application of the attachment to the machine is extremely simple; the standard compound rest and swivel are

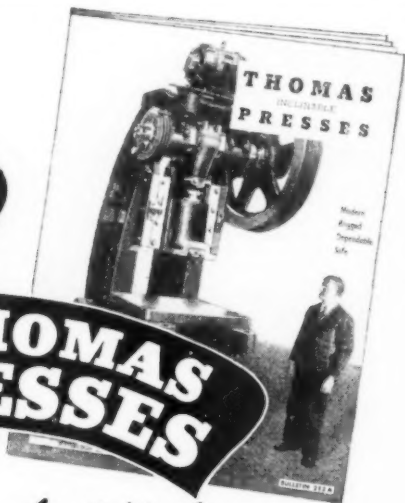
used in the conventional manner and may be set to any desired angle. The set up time is no greater than normally required for the standard Taper Attachment, making the machine extremely productive on work of this kind, peculiarly adaptable for short run work. In setting up it is only necessary to set the first diameter on the first piece accurately to gauge; thereafter the operation and resultant accuracy is automatic with the exception of whatever adjustments may be necessary for tool wear.

For further information, literature and complete specifications, write:

Cincinnati Lathe and Tool Co.  
Dept. BB, Cincinnati, Ohio

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*on* **THOMAS  
PRESSES**



In this new Bulletin you'll find specifications and illustrations of the complete Thomas line of Open Back Inclinable and Horn Type Presses. Ask for Bulletin 212-A.

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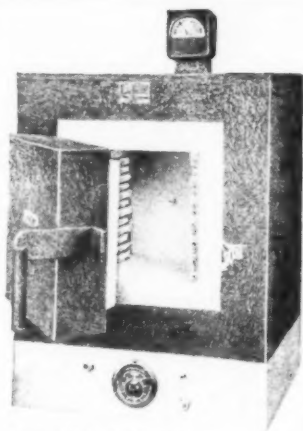
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Model 7053—8 x 8 x 10

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**AUTOMATIC ELECTRIC CONTROL**

**9 MODELS**

- Muffle sizes 6" x 6" x 6" — 8" x 8" x 10" — 12" x 12" x 12"
- Temperature Range to 2000° F.
- Priced from \$123.00, F.O.B. Plant, Phila.
- Also Electronic Controlled from \$275.00

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Curt Loeser,  
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**GILBERT S. SIMONSKI,**  
LUCIFER FURNACE DIVISION

**401 N. Broad St.,**  
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# For COMPACT Design

*Specify*

COMPACT DESIGN

HIGH TORQUE

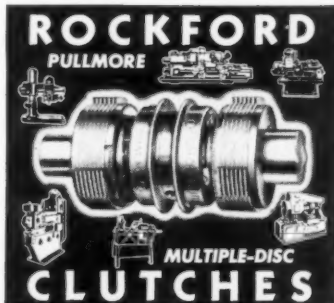
HIGH-RATIO LEVERS

POSITIVE NEUTRAL

PRECISION BUILT

LONG WEAR LIFE

EASY ADJUSTMENT



These compact, powerful, multiple-disc clutches are helping product engineers reduce size and weight between the driving and driven units of machine tools, lift trucks, overhead cranes and a wide variety of other equipment. Readily fit into product designs, accommodating great torque capacity within small size. Precision grinding insures perfect fit on the shaft.

**Send for This Handy Bulletin**

Shows typical installations of **ROCKFORD CLUTCHES** and **POWER TAKE-OFFS**. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.



**ROCKFORD CLUTCH DIVISION** **BORG-WARNER**

▲ 1309 Eighteenth Ave., Rockford, Illinois, U. S. A. ▲

*Pullmore Clutches are sold by Morse Chain Co., offices in principal cities*

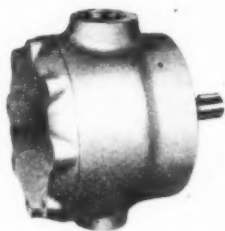
### NEW SUNDSTRAND LARGE DISPLACEMENT PUMP

The Sundstrand Machine Tool Co. has added a new constant displacement, hydraulically balanced pump to its line of hydraulic equipment. This pump has been designed and tested for continuous duty at 1000 psi operating pressure, although pressures up to 1500 psi may be utilized for intermittent service.

Pumps will be available in capacities ranging from 2 to 75 gpm with three basic sizes covering the complete range. Interchangeable cartridges provide four capacities within each of the three basic sizes. This cartridge sub-assembly simplifies pump inspection and provides means for quick change of pump rotation and pump capacity within the range. At present, the intermediate size in either of four capacities of 10, 13½, 20½ or 27 1/2 gpm (at 1000 psi) can be furnished.

Since the pumping action is distributed to maintain complete pressure balance, bearing loading is reduced to a minimum, and the pump has a high volumetric and overall mechanical efficiency.

Other features include a large displacement within relatively small housing, new mechanical oil seal design presenting oil



leakage along the shaft, and multi-porting connecting all pumping areas to assure unrestricted flow.

Write for descriptive bulletin No. 131 to:

**The Sundstrand Machine Tool Co.  
Hydraulic Div., Dept. BB,  
Rockford, Ill.**

### COVEL SURFACE GRINDER REQUIRES NO SET-UP

A new hand-fed surface grinder, the Excel No. 7, designed to grind tools, dies, chip breakers, and similar tool room jobs, has been designed by the Covell Manufacturing Co. The new grinder is also



suitable for many production jobs by relieving other grinders of smaller work. Convenient grouping and location of the controls offers complete accessibility to the operator from any working position.

Because of the simplicity of control, small odd lot jobs may be handled with speed and precision. In setting up a job, the operator needs only to bring the wheel to the work and begin grinding; there are no dogs or feeds to set or adjust.

Fine finishes are assured due to the precision ball bearing sealed-for-life spindle. Smooth table operation is accomplished through hardened spiral pinion and rack. The ways are dust protected, and the motor is completely enclosed in the base. The unit is furnished either in bench or floor type; a wet grinding attachment is available upon specification.

Complete measurements on the new Excel No. 7 Surface Grinder may be obtained upon request to:

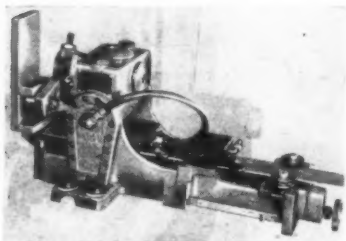
**Covell Manufacturing Co., Dept. BB,  
Benton Harbor, Mich.**

### COMPACT HYDRAULIC STOCK FEED FOR PRESSES

A hydraulically-operated stock feed for use on most punch presses is announced by Haller & Mfg. Co., Inc. This unit handles all stock up to 4" width and 3/32" thickness and feeds lengths from 0" to 5", to within .003" to .005". This precision feed saves stock, reduces downtime for die sharpening, and increases the service life of dies.

Known as the Haller Model D-600 Hydraulic Stock Feed, this compact unit is

mounted on the bolster plate of the press and can be located to feed from the left, right, front or back. It is driven directly from the press ram, with any ram stroke up to 6", and has sufficient power to pull the stock through a roll-type straightener. Installation and adjustment are so simple that this Stock Feed can be readily removed from one press and used on another when desired. Dimensions are 20" long x 10½" wide x 10¼"



high; the net weight is 58 lbs. Complete information will be sent upon request to:

Haller Machine & Mfg. Co., Inc., Dept.  
BB  
7940 Tireman Ave.,  
Detroit 4, Mich.

#### NEW MOTOR-MICA PACKAGE

Scientific Lubricants Co. has announced that their product, Motor-Mica Anti-Friction Compound, is now available in a compact new container, tubular in shape, measuring 2¾"x1½", weighing only 2 ounces, and designed to permit Motor-Mica to be easily carried in tool kits. Maintenance and shop men will find this new smaller container a useful addition to their tool complement. It keeps a convenient quantity of Motor-Mica handy for immediate application whenever lubrication troubles occur.

Motor-Mica is a white anti-friction compound, in powdered form, prepared as a general lubricating aid. It is said to reduce friction and heat to a minimum; cools hot bearings, makes them run free; simplifies threading, drilling, tapping, die-casting and other machine shop operations. For complete details, write:

Scientific Lubricants Co., Dept. BB  
3469 N. Clark St.  
Chicago 13, Ill.

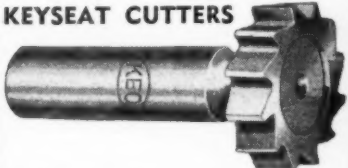


## CENTER DRILLS



Made of finest high speed steel. Available in all standard sizes. Always in stock for immediate delivery. Specials made to your specifications.

## KEYSEAT CUTTERS



High speed. Right hand. ½" shank. Diameters from ¼" to 1½". Standard sizes in stock for immediate delivery. Complete set—41 sizes—available in sturdy, hardwood box. Saves time and money, because you always have the size you need.



## CENTER REAMERS

High speed steel. Reamers from ¼" to 1" regularly furnished with 60°, 82°, 90° included angle. Specials made to your specifications.

## LATHE MANDRELS



Precision made of tool steel, hardened and accurately ground. Tapered .0005" to the inch. Mandrels from ⅛" to 1" are .0005" undersize at small end, from 1½" to 3", .001" undersize. Immediate delivery.

### Write for Literature

Illustrated literature and prices on all KEO Products mailed on request.

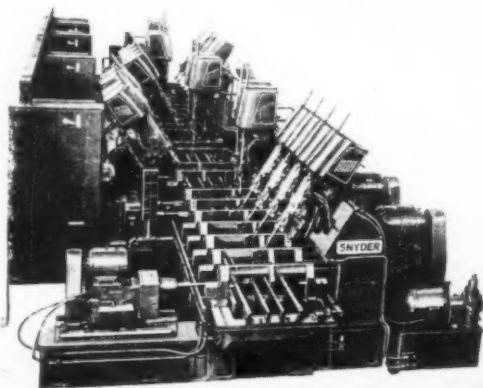
## KEO CUTTERS

19326 Woodward - Detroit 3 Mich.

## NEW SPECIAL CRANKSHAFT DRILLING MACHINE

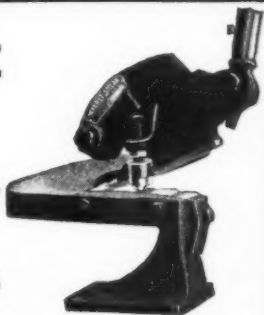
The new machine automatically indexes work pieces past a series of self-contained automatic vertical, horizontal and angular machining units which drill all oil holes and drill and ream two welch plug holes in the cranks. The machine has increased production of oil holes in steel crankshafts to a rate of 60 cranks per hour.

Work pieces are loaded at one end of the machine and shuttled through 28 stations by an index bar. At each station, the work pieces are positioned and clamped automatically and drilled or reamed by hydraulically actuated machining units which operate in an automatic cycle initiated at a central push button station. Twenty-four Avey standard deep-hole units and eight horizontal units are employed.



Avey spindles retract automatically when drills are overloaded through excessive chip accumulation or variations in metal

## CUT ANY SHAPE BETTER with BEVERLY Throatless SHEARS

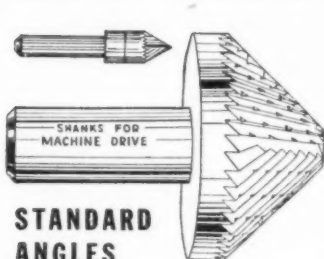


The No. B-3 BEVERLY Bench Type Shear with Ball Bearing Hold Down handles 3/16" or No. 10 gauge stainless steel. This sturdy shear weighs 58 lbs. and is equipped with H. C. H. Blades for heavy duty service

Let us send Bulletins giving full details on the BEVERLY LINE —

**THE BEVERLY SHEAR MFG. CO., 3005 W. 110th Pl., Chicago 43, Ill.**

## INSIDE DEBURRING CUTTERS



### STANDARD ANGLES

30° - 45°  
STOCKED IN 8 SIZES  
EACH ANGLE



SPECIAL ANGLES  
FROM STOCK BLANKS



HIGH SPEED  
STEEL



HANDLES  
FOR  
HAND USE  
(4 THREAD SIZES)

RADIUS TYPE  
10 SIZES

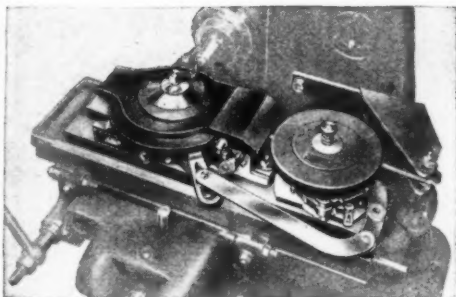
WRITE FOR BULLETIN NUMBER 15-1

**SEVERANCE TOOL INDUSTRIES INC.**

722 IOWA STREET

SAGINAW, • MICHIGAN

## Maximum Production . . . in Chucking and Indexing



With the new Dearborn Automatic Indexer connected to a Dearborn Chucking Fixture: chuck is closed automatically; indexed the required number of times automatically; chuck is opened automatically; piece is knocked out automatically.

When used with the Dearborn Degree Indexing Fixture it can quickly be set to index any number of degrees from 30° to 90° at one indexing and then knock out, or it can be set to index from no degrees to 90° and then not knock out.

WRITE FOR FURTHER INFORMATION

**J. W. DEARBORN**

**ANSONIA, CONN**

hardness. Horizontal units carry multiple heads for drilling leader oil holes in both the stem and the flange end of the crank. Vertical and angular Avey units drill all deep oil holes. High speed drills and reamers are mounted in standard adjustable sleeves. The machine has been designed to provide ample space at all stations for changing tools.

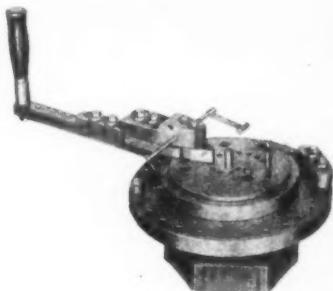
Coolant is supplied from a central system and chips are collected by a chip conveyor travelling the full length of the machine. The machine is approximately 18 feet wide and 39 feet long.

Snyder Tool & Engineering Co.  
Dept. BB. Detroit, Mich.

#### NEW BENDER FORMS LARGE RADII IN LIGHT MATERIALS

The Di-Acro No. 1A has all of the construction and operating features of all Di-Acro benders, including Torrington roller bearings. The new precision multi-purpose bending machine will form and duplicate an unlimited variety of parts and pieces on a production basis. It will also create shapes and outlines impractical or impossible to obtain with regular production dies. All types of ductile materials may be formed or bent: round, half-round, hexagon and square

rod, etc. The universality which has been built into the Di-Acro bender allows this precision machine to cover

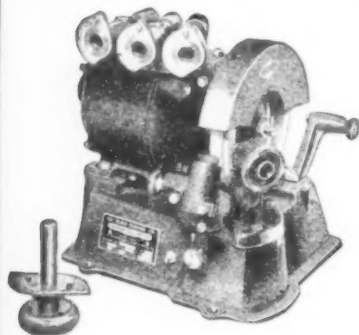


its wide working range with the addition of simple conversions. These conversions can be prepared right on the job as forming requirements arise from day to day. For further information, write:

O'Neil-Irwin Mfg. Co. Dept. BB  
314 8th Ave.  
Lake City, Minn.

## —BLACK DIAMOND—

### SMALL DRILL • PRECISION GRINDER



If you use small gauge or fractional drills—singly or in gangs—by hundreds or thousands—this moderately priced machine—motor driven—will keep any quantity sharp and ready for any job.

Anyone can operate a Black Diamond. Even the most inexperienced can keep all drills sharp and true centered, with smooth lips ground to exactly the same length—at the proper angle and with correct clearance for fast, precision drilling.

Black Diamond Grinders cut 50% and more on drill grinding as well as drilling costs, sharpen without waste of expensive drill stock, reduce drill breakage and work spoilage to a minimum.

The built-in Diamond Dresser keeps the grinding wheel ever-sharp cutting and the Web Thinning Attachment cures for all types of Notched points to perfection.

WRITE FOR MORE COMPLETE DETAILS

**BLACK DIAMOND SAW & MACHINE WORKS, INC.**  
**NATICK, MASSACHUSETTS**

— MILLING —

**BURKE**

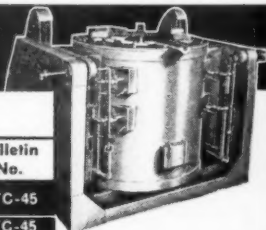
— MACHINES —

**Put Your Small, Difficult Work  
ON A PRODUCTION BASIS!**

- Burke Milling Machines are fast, economical and indispensable in shops handling small, difficult work.
- 4 Types TO MEET YOUR REQUIREMENTS—Nos. 1, 2, 3, and 4.
- Motor Driven for Fast, Economical Production.
- Timken Roller or Ball Bearings to Spindle.
- A Number of Attachments Available: Vertical Milling Attachment; Index Centers; Vises—3 types, including swivel base.



WRITE FOR COMPLETE INFORMATION

**BURKE MACHINE TOOL CO. 510 Sandusky St., Conneaut, O.****NON-FERROUS METAL  
MELTING FURNACES****SELECTION TABLE**

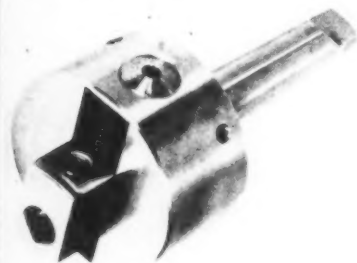
		TYPE	Max. Temp.	Series	Recommended for	Bulletin No.
TILTING	CRUCIBLE		2500°F.	TCR	Melting Brass and Copper	TC-45
			1400°F.	TCA	Melting Aluminum	TC-45
	POT		1400°F.	TP	Melting Aluminum and Magnesium	TP-45
STATIONARY	CRUCIBLE		2500°F.	CR	Melting Brass and Copper	CR-45
			1400°F.	AC	Melting Aluminum	AC-45
			1400°F.	AM	Melting Aluminum	AM-45
	POT		1200°F.	SM	Melting Soft Metals	AM-45
			1000°F.	SA SAV	Melting Soft Metals	SV-45

**'Surface'****Standard Rated  
FURNACES****SURFACE COMBUSTION CORPORATION, TOLEDO 1, OHIO****WRITE  
FOR  
COMPLETE  
SPECIFICATIONS**

When Writing Advertisers Please Mention MACHINE and TOOL BLUE BOOK

### FLYNN BORING HEAD REDESIGNED

The Flynn No. 12 off-set boring head has been made more compact to permit the extension of the tool block nose beyond the body, permitting easier accessibility to recessed and hard-to-reach



portions of the work. Other changes include: wall of the tool grip has been increased  $\frac{1}{8}$ " on each side; length of tool increased  $\frac{1}{2}$ "; ground bearing surfaces have been increased at two points by as much as 60%; space between ways

has been reduced, thus centralizing the adjusting micrometer screw.

Dial on the micrometer adjusting screw is easier to read. With the introduction of a lock tension screw, strain on the hardened and ground micrometer screw is relieved. Square hole adjusting screws have been replaced with standard hex screws, with one wrench fitting all adjustments. For further information, and bulletin, write to:

Flynn Mfg. Co., Dept. BB  
433 Bates St.  
Detroit 26, Mich.

### HAMMERS FEATURE NEW CONSTRUCTION

A new improvement in the construction of their line of chipping hammers is announced by Atlas Welding Accessories Co.

Atlas hand forged heads are now drilled half-way through and the handles silver brazed into the hole. The process, which is the same as used by cutting tool manufacturers in attaching carbide tips to cutting tools, is the most efficient and permanent process known. The end of the handle is machined to fit the base of the drilled hole so that the

## IMPROVE PRODUCT PERFORMANCE

with HAN-DEE Springs, Wire Forms and  
Screw Machine Products

A spring for every purpose, no matter how small, can be engineered for your product by HAN-DEE, in the quantity you desire. Individual attention will be given to your unusual problems by our competent engineering staff.

Facilities for machining castings and small assemblies.

For prompt efficient service . . . for quality springs at low cost, consult HAN-DEE. A sample or blueprint will bring a prompt quotation.

**THE HAN-DEE SPRING and MANUFACTURING CO.**  
2070 PARK STREET HARTFORD, CONNECTICUT





silver flows, cementing the handle to the head, over the entire surface of



the hole. The Atlas all-metal design, incorporating the metal handle, makes this new, stronger, smoother construction possible.

Formerly the hole was drilled all the way through the head and the handle arc welded at the end. For additional information write:

Atlas Welding Accessories Co.  
Dept. BB, 707 E. Lewiston  
Ferndale, Mich.

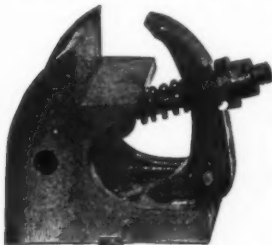
## NEW AIR-HYDRAULIC PRESS, 1200 LBS. CAPACITY

Air-Hydraulics, Inc., manufacturers of a line of air-hydraulic presses and foot operated hydraulic arbor presses, announce a new press. A small air-hydraulic press with a capacity of 120 lbs. has been added to their line of 2½, 4, 6 and 10 ton models. Like the large models, the new small press does assembling, flanging, broaching, forming, marking, riveting, crimping, staking, etc. This press is the answer to the demand for a smaller, inexpensive air-press.

The pressure of 1200 lbs. is based on air inlet pressure of 100 lbs. . . . 1 to 1 ratio. It has a 6" throat, 2½" stroke ¾" ram, 5" square platen. Lugs in the base make it suitable for bench mounting. Spring or power return are optional. The spring return model has a single-acting cylinder; the power return model a double-acting cylinder and 4-way valve. Constructed with heavy ribbed castings and a solid steel shaft that affords a vertical adjustment up to 6".

Air-Hydraulics, Inc., Dept. BB,  
401 Broadway,  
New York 13, N. Y.

# HART MILLING FIXTURES



## MASTERS OF A THOUSAND SET-UPS

Hart Milling Fixtures firmly hold any shape stock—Round, Hexagonal, Octagonal, or Square for machining, automatically aligning the stock with the machine. Fixtures may be set up in horizontal or vertical position. The grip holds the work on bottom as well as on back.

Hart Milling Fixtures have proved their efficiency in thousands of shops throughout the nation as well as abroad. They materially cut jig and Fixture expense.

Made in 4 sizes for stock from ½ to 5 inches. Shipped in pairs unless otherwise ordered.

Write for more complete details

Size ¾"—Cap. ½" to 1 ⅛"  
Size 1 ½"—Cap. ¾" to 1 ¾"  
Size 2 ½"—Cap. 1 ¼" to 2 ⅞"  
Size 4"—Cap. 2 ½" to 5"

## HART MACHINE COMPANY

26 Mather Street

Dorchester - Boston 24,

Massachusetts

## PROTECT AIR TOOLS from MOISTURE DAMAGE

Condensation of water in your air lines washes out the lubricating oil and causes expensive damage to air tools and pneumatically-operated equipment.

This condensation occurs when the temperature of the air surrounding your lines and tools falls below that of the compressed air. Ordinary cooling with surface water does not prevent this, but it is prevented by the Niagara Aero After Cooler which always cools below the dry bulb temperature of the surrounding air.

In addition, the Niagara After Cooler saves you the cost of water in cooling and pays for itself in a short time.

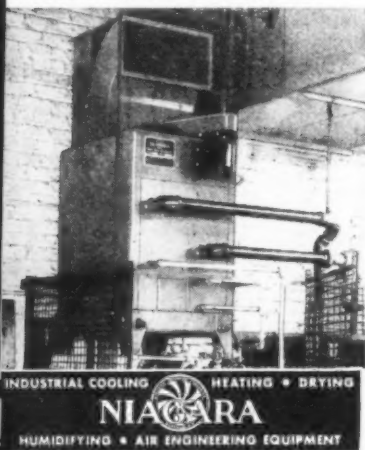
Write for Bulletins 96MT and 98MT

### NIAGARA BLOWER COMPANY

Over 30 Years of Service in Industrial Air Engineering

405 Lexington Ave. New York 17, N. Y.

District Engineers in Principal Cities



### STANLEY 1/4" ELECTRIC DRILL USEFUL IN CLOSE QUARTERS

A compact, light weight, small-size portable drill, No. 24, of 1/4" capacity, has been added to the line of Stanley Electric Tools. It is claimed to be suitable for drilling in metal, wood and plastics, up to its rated capacity. Only 8 1/2" overall, and weighing only 3 3/4 lbs., it is useful for working in close quarters, and is easily portable for installation work and on-the-job repairs.

Features of the No. 24 Stanley Drill include an aluminum die cast housing, durable gears, trigger type switch with



locking device, three-jaw geared threaded Jacobs Chuck, positive cord clamp, three-wire rubber-covered cord with spring protector. The No. 24 Drill is convertible to a bench drill press by locking the Drill in No. 514 Stand. Complete information:

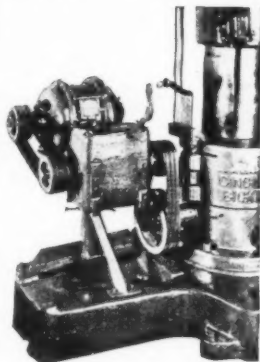
Stanley Electric Tools, Dept. BB,  
Div. of The Stanley Works  
New Britain, Conn.

### AIRMATIC DEVELOPS HIGH-SPEED SOLENOID VALVE

Airmatic Valve, Inc., has developed a non-corrosive, full capacity, 3-way direct operating solenoid controlled valve, Model DS-3, which offers distinct advantages to industry, since it eliminates pilots, levers, and other types of "indirect control." The Model DS-3 can be mounted in any position and can be operated continuously without harm to the valve or solenoid. The solenoid is rated 1.42 amperes inrush, .22 amperes holding at 110 volts, 60 cycles. Internal parts are precision machined and corrosion resistant. This long life, low amperage solenoid valve is claimed to be able to fill the needs of industries seeking to make their machines automatic in operation. Furnished in four standard pipe sizes 1/4" - 3/8" - 1/2" and 3/4". Complete details from:

Airmatic Valve, Inc., Dept. BB  
1643 E. 40th St.,  
Cleveland, Ohio.

# THE BERKELEY POWER DRIVE

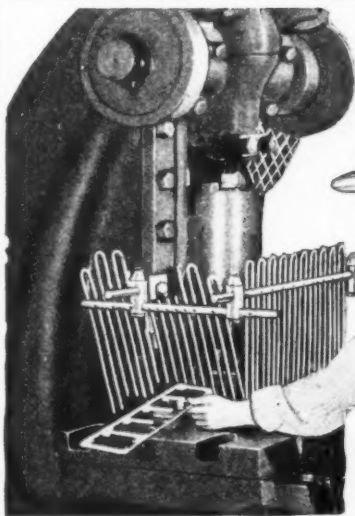


**For over twenty years the drive to better and greater production.**

One of several types of adaptations of a BERKELEY drive to a Radial Drill Press.

*Manufactured exclusively by*

**THE DANVILLE TOOL CORPORATION  
DANVILLE, ILLINOIS**



## SAVE HANDS WITH STRANDS

**SAFGUARDS  
FOR PUNCH  
PRESSES**

*Send for Enclosure  
and  
Sweep Safeguard  
Circulars.*

**STRAND MFG. CO., INC.  
SAFETY ENGINEERS**

**607 West Lake Street Chicago 6, ILL.**

**OUR  
EFFICIENT  
TOOL DESIGNING**

*means  
better production  
at a lower cost*

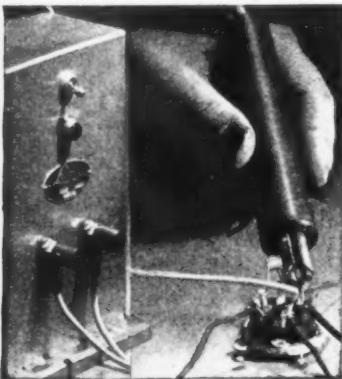
Efficient tool designing in post-war's competitive production is a "must". Our experience guarantees you tools—designed for economy of operation, resulting in your increased production at lower costs.

**COLUMBUS DIE TOOL**

*and Machine Co.*

930 CLEVELAND AVE., COLUMBUS 1 OHIO

**LUMA Soldering Tool**



**RESISTANCE TYPE**

A proven tool for all soldering jobs large or small. Heats instantly—low maintenance. Safe to operate. Write for details.

**LUMA ELECTRIC EQUIPMENT CO.**

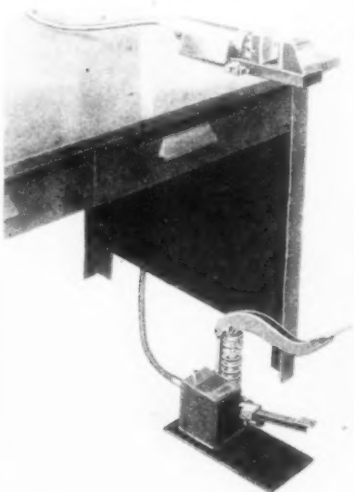
P. O. Box 132-H

TOLEDO 1, OHIO

**TIME AND SPACE-  
SAVING  
HYDRAULIC VISE**

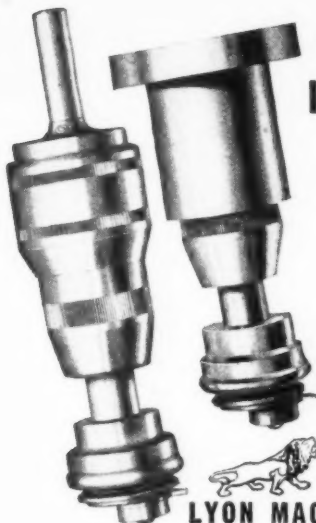
This pedal-actuated hydraulic vise is lighter in weight and more compact than its predecessor models. It is designed to step up production, since the operator can keep both hands on the job at all times. The device is equipped with two convenient foot pedals, one of which tightens, the other releases, the vise jaws.

The vise is fast-acting, and requires little energy to operate. It eliminates hazards caused by the operator juggling a part with one hand while tightening the vise with the other. It is a precision accessory, built for strength as well as speed. The unit has a 2-ton capacity; the overall height is 3", the depth of jaws is 2"; the maximum jaw opening is 2½"; the overall length is 15".



The vise is of all-steel welded construction, with an all-steel hydraulically operated foot control unit, and a long base for extra rigidity. It is equipped with slotted lugs for milling machine, drill press, or bench. A stop can be inserted in back of the movable jaws to control the opening. For complete information, write:

**Muntion Manufacturing Co., Dept. BB**  
Franklin Park, Ill.

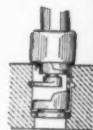


## The Lyon INTERNAL GROOVING TOOL

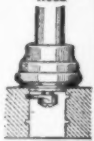
Its versatility saves costly preparation time—provides precision grooving of single or multiple grooves at a production rate—plus economy of set-up time—and low initial cost. The LYON has been designed for making internal grooves to tolerances of .001" using any drill press, turret lathe, radial drill or automatic equipment.

By changing only bushings and cutters within the tool model range, you have at your command a wide variety of bore sizes and shapes. A simple adjustment regulates location and depth of groove. Work cannot be scratched or marred because the head of the tool does not turn when the cutter operates.

Our Engineering Department will welcome the opportunity of discussing any grooving problem without obligation.



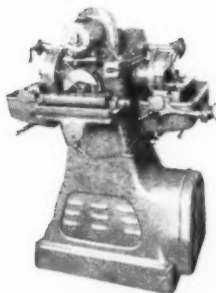
GROOVE  
LOCATED FROM  
BOTTOM OF  
HOLE



SINGLE GROOVE  
LOCATED FROM  
TOP OF HOLE

LYON MACHINE CO., WORCESTER 3, MASS.

## HOW TO GRIND CARBIDE CUTTING TOOL BITS ECONOMICALLY



### Here's tool grinding at its best!

Employing 3-step progression—rough, semi-finish, and finish or hone—on one machine, this LeMaire 3-Wheel Grinder produces keener edge in fraction of time. Because tools go to diamond wheels in better condition, life of diamond wheels is considerably lengthened. Both labor and wheel costs are reduced—time is saved—production is increased.

Wouldn't you like to know more about this remarkable 3-Wheel Grinder? Send for descriptive folder.

**LeMaire Tool & Mfg. Co.**

2637 S. Telegraph Road  
Dearborn, Michigan

Designers and builders of unit and way type machines for single or multiple spindle drilling, boring, reaming, tapping, etc.—Twin Ram Hydraulic Units—Match-It Gear Chucks.

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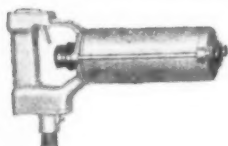
**For Time-Saving  
and Money-Saving**

**Concrete Drilling  
Cutting & Chipping  
USE**

***SYNTRON***

**DEPENDABLE**

**ELECTRIC  
HAMMERS**



3600 powerful blows per minute make short work of drilling anchor bolt holes — cutting holes for steam pipes, water pipes, conduit — scaling rust and old paint from metal surfaces, etc.

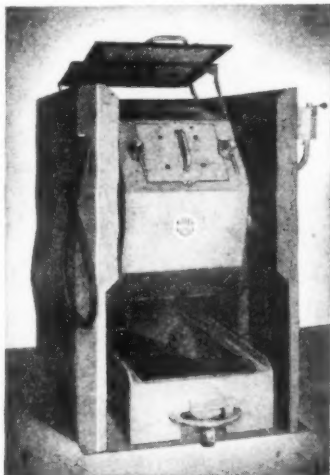
*Illustrated folder on request*

**SYNTRON CO.** 300 Lexington  
Homer City, Pa.



#### **NEW ROTO-FINISH MACHINE**

A one compartment Roto-Finish machine for small mechanized de-burring and finishing installations is announced by The Sturgis Products Co. Known as the CW-22-1 Model, it has sturdy design and operational features which permit efficient and economical processing of small parts, using Roto-Finish Grinding, De-Burring, Britehoning or Coloring Processes.



The one-compartment cylinder—19" x 32" I. D. is lined with replaceable kiln dried hardwood maple and equipped with a light weight door, with newly designed molded rubber gasket, held in place by rugged cam locks.

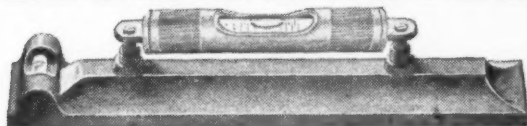
Standard equipment includes a forward and reversing switch with synchronized magnetic brake to facilitate loading and unloading; water attachment, including a control valve for adding water to the processing compartment; a 1½ h.p. 220-440-volt, 60 cycle, 3 phase motor with gear reducer; and a swivel type, 3 point suspension hoist pan for loading and unloading the processing media. For complete information, write to:

**The Sturgis Products Co., Dept. BB**  
Sturgis, Mich.

**SPECIFY**

*Hall...*

**PRECISION LEVELS**



**FIG. NO. 5** Adjustable type Machinists' Levels with ground and graduated vial. Grooved for use on shafting. Sizes 4", 6", 8", 12", 18".

**"MANUFACTURERS OF  
SPECIAL LEVELS  
FOR ANY USE."**

**FIG. NO. 50**—For setup and maintenance is accurate to 10 seconds. Graduations are in .0005" per foot. Packed in Instrument Case.

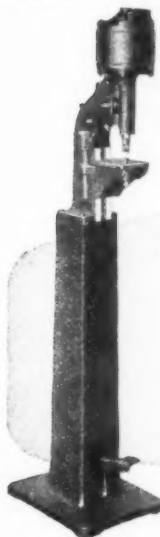
Address Orders or Inquiries to

**HALL LEVEL AND MANUFACTURING WORKS**

(Established in Geneva, Ohio, in 1913)

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**LINLEY**

**FOR NOISELESS, HIGH SPEED RIVETING**

Rotary spinning principle shapes uniform heads, silently . . . capacities up to 3/8 inches diameters. Adjustable spindle stroke, controlled pressure . . . double row radial thrust bearing supports spindle, assures long life. Table elevating screw prevents slipping. Six floor or space-saving bench models . . . sturdily built for trouble-free operation under severe production schedules.

**FOR COMPLETE INFORMATION,  
WRITE FOR BULLETIN.**

**LINLEY BROTHERS CO., 663 STATE ST. EXTENSION  
BRIDGEPORT 1, CONNECTICUT**

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## HARTMANN VISE EQUIPPED WITH WEAR COMPENSATING MECHANISM

Industrial Enterprises, Inc. announces the Hartmann "600" Drill Press Vise. This new tool is said to represent a revolutionary advance in the design and manufacture of vises. It consists of a 6" Vise which operates on direct lever action on a push lock, eliminating the usual waste of time and energy required to open and close screw type vises.



The principle feature of the vise is the patented locking wear compensating mechanism. There are no rings or threads to wear out. The locking lever arm engaging on a hardened cam pivoting in a collar on an eccentric, bears forward gripping pressure on the rod (hardened to Rockwell C62-65), which thereby is pushed ahead, exerting pres-

sure on the jaws, locking the work in position.

The Model "600" is precision built, and provides almost unlimited adaptability. For further details, write:

Industrial Enterprises, Inc., Dept. BB  
201 Sixth St.,  
Racine, Wis.

## NEW DRILL FOR HARDENED STEEL

For shops which frequently find it necessary to drill holes in dies, fixtures, etc., after the metal has been hardened, Super Tool Co. announces a new line of standard carbide tipped drills designed specifically for this purpose.

The new drill is provided in 10 sizes ranging from 3/16" to 3/4"; an instruction sheet is enclosed.

Practical experiment with this new carbide tipped tool has indicated excellent results, even on deep holes, regardless of the Rockwell hardness. It can be used either dry or with coolant. Care must be exercised in this type of



drilling. It is necessary that the tool be kept sharp and that it be fed by hand. A bulletin listing dimensions and prices is available.

Super Tool Co., Dept. BB  
21650 Hoover Road  
Detroit, Mich.

## "STAR DUST" LABORATORY GRADED PURE DIAMOND POWDERS

For GAUGES, TOOLS, DIES, etc., with tremendous TIME SAVING. These factors make STAR DUST indispensable in lapping and superfinishing on HARDSTEELS, TUNGSTEN CARBIDE, CHROME.

- Absolute control of particle sizes
- STAR DUST sizes as fine as .0001"
- Complete absence of out-size particles
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There is a STAR DUST Field Serviceman in your territory.

STAR DUST speeds up production enormously and produces finishes and superfinishes down to less than .0000004 of an inch.

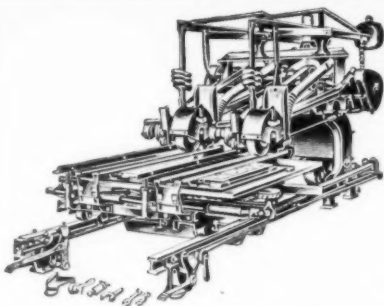
Precision LAPPING  
POWDERS for  
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## ACE ABRASIVE LABORATORIES

ONE SPRUCE STREET  
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EXCELSIOR No. 27  
**AUTOMATIC**  
 GRINDING and POLISHING  
**MACHINE**

EXCELSIOR TOOL & MACHINE CO., EAST ST. LOUIS, ILLINOIS

HERE IS A  
*Machine*

FOR  
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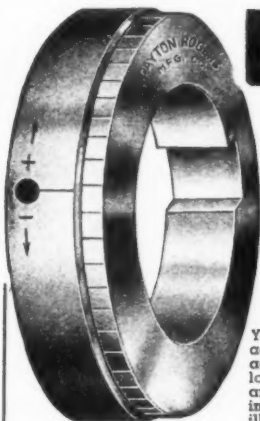
*Stove Tops*

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**FAST, ACCURATE SPACING**

Graduated in thou-  
 sandths, you have  
 plus or minus .0005"  
 at your fingertips  
 with

**DAYTON ROGERS  
 ADJUSTABLE  
 SPACING COLLARS**

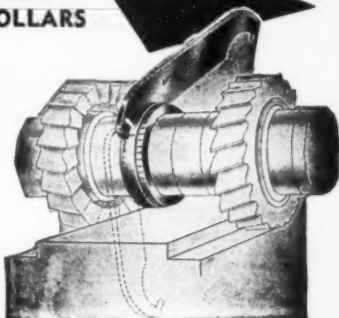
You can make an  
 accurate, positive  
 adjustment just by  
 loosening the cutter  
 arbor nut and mak-  
 ing adjustment as  
 illustrated.

Made in 12 standards for cutter arbors from  
 $\frac{3}{8}$ " to 2". Write for illustrated Bulletin 120-7.

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 2849 12TH AVE. SO., MINNEAPOLIS 7, MINN.

*for*  
**SIDE MILLING  
 CUTTERS**

**GANG MILLING  
 SET-UPS**



## SNYDER TWO-WAY, 8-STATION AUTOMATIC PERFORMS 6 OPERATIONS ON CAST-IRON BLOCKS

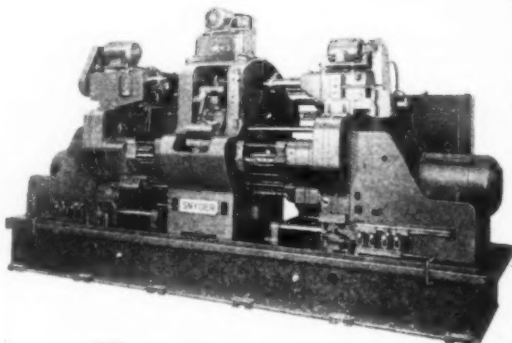
Among special-purpose, automatic machines recently designed by Snyder Tool & Engineering Co., is a two-way hydraulic feed machine which drills, reams, countersinks, spotfaces, bores and taps holes in both ends of hydraulic lift cylinder blocks.

The machine has eight work-stations with eight trunion-mounted work-holding fixtures in which the work-piece is clamped manually. An electrically operated automatic Geneva index routes the work through successive operations.

Mounted opposed are two master drive heads from which power is transmitted to individual auxiliary heads at each station. Auxiliary heads carry individual

bushing plates located on a fixture to maintain accuracy in the work.

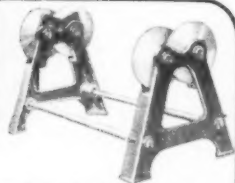
Master drive heads are also equipped with rapid-advance tapping heads with



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### Balancing Tool for Your Work from Sundstrand's Complete Line

Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart at right.



#### CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
44 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

#### FREE ADDITIONAL DATA

You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin No. 469.



## SUNDSTRAND

### MACHINE TOOL COMPANY

2535 Eleventh St. Rockford, Ill., U.S.A.

individual lead screw tapping spindles which feed the tap into and out of the work, assuring an accurate thread.

The machine is fully automatic and can be satisfactorily operated by unskilled labor. Tools are high-speed steel and carbide; drill speeds are 80 feet per min. and reamers 45 feet per min. Feeds are variable and are adjusted by hydraulic meter valve. Production is forty pieces an hour at 80% efficiency. Additional details and specifications upon request to:

Snyder Tool & Eng. Co., Dept. BB  
3400 E. Lafayette Ave.  
Detroit, Mich.

### MONROE STEEL COLLAPSIBLE PALLET BOX

The Monroe Auto Equipment Co. has recently added to its line of material handling equipment with the introduction of a collapsible pallet box, and a full line of accessories including a new lightweight, eight-way, all-steel pallet; two-way steel and steel and wood pallets; standard skid boxes and nestling rings; skids and kindred products.

The collapsible pallet box utilizes the Monroe eight-way, all-steel, 40" x 48" pallet as a base, and has 8-gauge steel wire sides 24" in height, forming a container for handling and shipping of loose material. When not in use or when being returned empty, the wire sides fold down compactly onto the top of the pallet, forming a unit only 7½" in depth to effect a saving in shipping and storage space.

The collapsible pallet box is available with either the heavier pallet weighing 96 lbs. or the lighter pallet weighing 69 lbs. Empty, the complete pallet-box on the heavier base weighs 169 pounds, and on the lighter base, 142 pounds.

The rugged pallet, made of high tensile steel in corrugated, crimped design that eliminates welding, and the sturdy steel wire sides, give this unit strength and durability which permit capacities ranging from 2,500 to 5,000 pounds in single loads, and 15,000 to 35,000 pounds in tiered loads. The pallet-box will hold nearly 27 cubic feet of material. Complete details furnished upon request to:

The Monroe Auto Equipment Co.,  
Dept. BB, Monroe Mich.

## ANTON PARALLELS

### INCREASE PRODUCTION

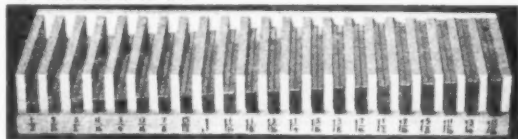
ANTON PARALLELS FILL A LONG-FELT NEED — permanently straight and accurate, yet priced for every-day general machine shop use.

ALL PARALLELS FULLY GUARANTEED — To be within the Limits Specified.

MAXIMUM SIZE TOLERANCE .001 INCH ON GROUND SIDES — Maximum Variation in Parallelism and Straightness within Length .0001.

ROCKWELL "C" HARDNESS 65 UP.

### IMPROVE QUALITY



ANTON PARALLELS COME IN 79 STANDARD SIZES

- ¼" Thick x 6" Long — ½" to 1½" High in Steps of ⅛".....\$96.00 per set — 22 pairs.
- ½" Thick x 6" Long — 1½" to 1½" High in Steps of ⅛".....\$71.00 per set — 11 pairs.
- ¾" Thick x 6" Long — 1½" to 1½" High in Steps of ⅛".....\$88.75 per set — 11 pairs.

\* Price per set includes a large Wooden Container

Large Stock of Single Pairs also Available

All Prices are F.O.B. New York

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EASTERN TOOL & MACHINE CO.  
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TOOLSKILL CO.  
55 E. WASHINGTON ST., CHICAGO 2, ILL.  
Representatives for  
Illinois, Iowa, Wisconsin  
Indiana and Michigan

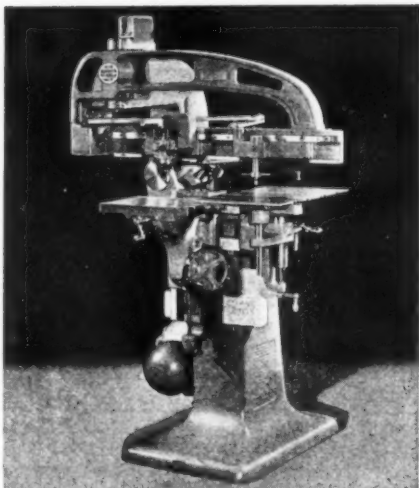
### **GORTON PANTOGRAPH HAS SPINDLE SPEED OF FROM 4,560 TO 18,000 RPM.**

The Model P13 pantograph conforms to the requirements of producers of small, intricate dies, molds, stamps, and hobs, as well as performing the conventional type of work of light pantograph machines.

This 3-dimensional machine employs an enlarged 3-dimensional Master, or pattern, which is mounted on the copy table. The surface of this Master is traced in three dimensions manually with the tracing style while the cutter reproduces at the desired ratio of reduction on the work piece all of the angles, curves, and surfaces of the Master.

Different sizes are produced from the same Master by changing the Pantograph ratio, or by changing the tracing style and cutter sizes. Ratios from 2 to 1 to 40 to 1 are obtainable. The pantograph bar is graduated for reductions of 1:2, 1:3, 1:4, 1:6, 1:8, 1:12, and 1:16. Other reductions are readily adjusted, since only one sliding adjustment is necessary. For enlarging work, one merely removes the tracing style and cutter spindle assemblies, and reverses their positions.

The cutter spindle feed of the unit is  $5/16"$ , with a corresponding cutter spindle collet size of  $5/16"$ . The longitudinal feed of the work table is  $10"$ ; the cross feed, with work up to  $3/4"$  thick, is  $5"$ ; work over  $3/4"$  thick, cross feed is  $2\frac{3}{8}"$ . The vertical feed of the work table is  $9\frac{3}{4}"$ .



The work table measures  $8" \times 12"$  in size. Maximum distance from the spindle nose to the table top is  $9\frac{3}{4}"$ . The unit is equipped with six spindle speeds, of from 4560 to 1800 rpm. For further information and bulletin write

**George Gorton Machine Co.  
Dept. BB, Racine, Wisc.**

### **NEW DISINTEGRATOR HAS MANY USES**

The Thomas Metal Master, originally designed to remove broken taps and other small tools from scrapped machined parts by disintegration, has become a machine of many uses. In addition to removing taps it also performs arc welding, cold welding, brazing, soldering, drill pulling, air gun extraction, etching and demagnetizing operations. The Metal master is portable, yet holds up to 1000 lbs. of metal.

The Super Model has an air cooled adjustable precision-built disintegrating head, adjustable to any position. Self

contained radial adjustment assembly with built-in coolant return is built for long life. The groundwork plate is tapped for securely strapping work down and is grounded to transformer. Post is  $82"$  high;  $27"$  radial arm has full 360 degrees radius. Special design rotary switch controls operating currents for all combined units. Coolant tank and motor with gear driven pump assures pressure for positive coolant flow. Equipped for 22 volts, 50-60 cycle. For descriptive bulletin, write:

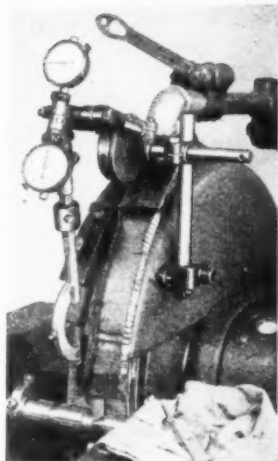
**Clinton Machine Co.  
Dept. BB, Clinton, Mich.**

## VISUAL GRINDING SIZE CONTROL

Well known. Visual reading. Grinding size and quality control on cylindrical grinders. Completely adjustable for all grinders. Thousands in daily use in U.S.A. Many in foreign countries.

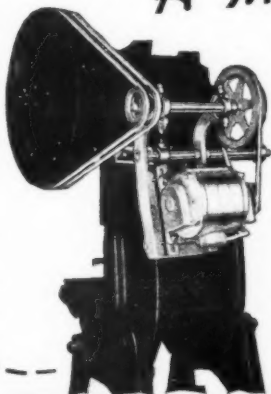
Diameter, diameter and length, splines, worms. Over 400 special designs for your problems.

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4200 WOODWARD AVENUE  
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## *A Modern*

### MOTOR DRIVE FOR EVERY MACHINE TOOL



The Modern Motor Drive shown here fills an urgent demand for an easily mounted economical Punch Press Drive.

Utilizing the jackshaft principle, permitting the use of standard 1750 R.P.M. Motors.

Brackets for direct drive from motor to flywheel are also available from stock.

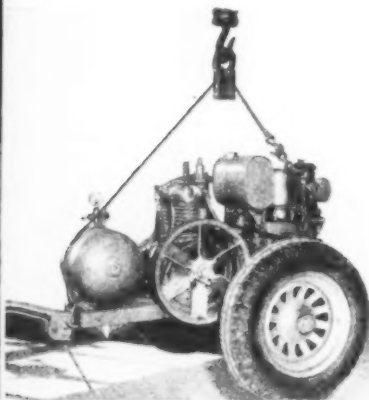
Write for catalog showing complete line of Modern Drives for other machine tool equipment.

**THE NICHOLS ENGINEERING COMPANY...**  
2400 W. MADISON ST. CHICAGO 12, ILL.

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### CALDWELL ADJUST-A-LEG EQUALIZING SLINGS

The Caldwell Company has developed an improved model of their Adjust-A-Leg Equalizing Sling, available in capacities ranging from  $\frac{3}{4}$ -ton to 12-tons. These units are designed to lift odd-shaped and unbalanced loads level or at nearly any predetermined angle; they are also useful for moving simple loads, and working in confined spaces.



The Sling consists of an equalizing unit made up of a sheave (with a V-shaped groove) carried by a spring-mounted axle, and a pair of brake shoes. The wire rope, which lays over the sheave in the V-shaped groove, has a hook attached to each end, forming two legs. The equalizing unit is placed on a crane hook and spotted by the operator over the approximate Center of Gravity. As the crane operator applies hoisting power, the sheave revolves to allow the legs to lengthen or shorten, adjusting themselves to the weight distribution of the load.

When load weight applies tension to the legs, the rope is pulled into the groove, holding the rope firmly in place. In turn, the sheave is pulled into the brake shoes, frictionally locking the legs until pressure is released; the brake is set frictionally in direct proportion to load, and the sheave revolves freely except under load.

Adjust-A-Leg Equalizing Slings are proving themselves in foundries, railroad repair shops, and other fields. They are especially suitable for handling heavy tools and dies, engines, motors, and boilers, and for heavy lathe centering work. For further information write:

**The Caldwell Company, Dept. 15  
1830 Camp Ave.  
Rockford, Ill:**

### OSCILLATING GRINDER MACHINES IRREGULAR SURFACES

This Universal Oscillating Precision Grinder was designed and developed to handle external and internal cylindrical surfaces; external conical surfaces and internal tapers; generated or formed spherical external and internal surfaces, or annular surfaces such as ball bearing races and fillets. Combinations of the above are ground in one set-up insuring extreme accuracy and perfect blending of straight to curved surfaces, according to the manufacturers.

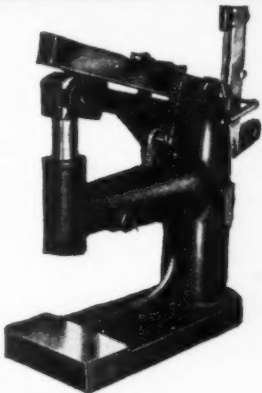


The grinding wheel spindles are mounted in pre-loaded, precision bearings; the spindle and motor are mounted on cross slides with micrometer screw feeds; both the longitudinal and cross slides may be equipped with dial indicators. Complete details and specifications are available upon request to:

**Gear Grinding Machine Co.,  
3940 Christopher St., Dept. BB  
Detroit 11, Mich.**

## Unskilled labor does PRECISION RIVETING

With a Weber Automatic Staking Machine, unskilled operators turn out more kinds of jobs faster and more accurately than any other method. Simple adjustment delivers the right hammer blow for each job whether staking fixed or movable joints. Write for folder.



	Model 1	Model 1-B	Model 2
Stroke	2"	2"	2½"
Spindle	1"	1"	1¼"
Throat Spindle	4¾"	4¾"	8¼"

# WEBER Machine Corp.

59 RUTTER STREET • ROCHESTER 6, NEW YORK

### DISTRIBUTORS

Some territories are still open, offering substantial profit possibilities. Write regarding yours.



**BORING, FACING &  
INTERNAL THREADING**

For holes from ¼" upward, 15 different sizes.

Made of Super-High-Speed Steel Specially Heat Treated  
Indispensable for your JIG BORER. The worm-like spiral of the boring heads provides a long, useful cutting surface. Their use insures perfect fitting threads. Correctly designed for precision work. f

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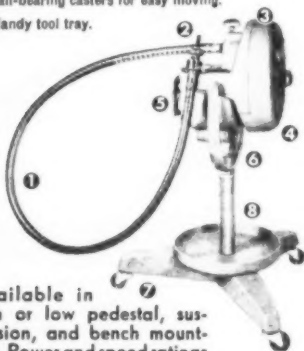
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# Up to the Minute APPEARANCE and CONSTRUCTION

## See the **NEW** **STOW** **STREAMLINER** FLEXIBLE SHAFT MACHINE

1. Genuine STOW flexible shaft, 6 ft. long. Tough heat-treated core,  $\frac{3}{8}$ " diameter. Durable, oil-resistant casing.
2. Ball-bearing handpiece, with detachable wheel arbor.
3. Quick change in speed ratio; selection of four shaft speeds.
4. Streamlined enclosed motor and drive for protection to user and machine—better appearance.
5. Ball-bearing, self-lubricated motor.
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7. Ball-bearing casters for easy moving.
8. Handy tool tray.



Available in high or low pedestal, suspension, and bench mountings. Power and speed ratings for great range of applications. The most modern flexible shaft machine available—backed by Stow's 72-year quality and performance reputation. Write for full description now, or see this smooth working, smooth looking STOW at your supply house.

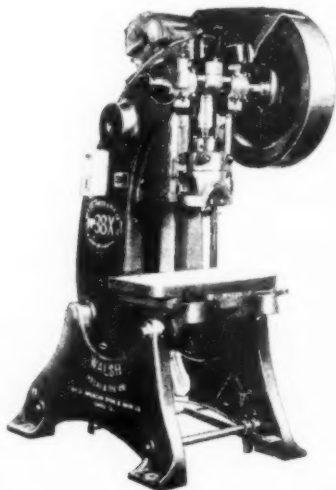
# STOW

MANUFACTURING CO.  
30 Shear St., Binghamton, N. Y.

## PUNCH PRESS WITH SELF ENERGIZED BRAKE

The Superior Punch Press Co., announces a new steel welded punch press in 70 and 100 ton capacity. Outstanding feature is the energized brake which is applied only at the moment of clutch disengagement. Therefore, the braking increases in pressure until the crankshaft reaches zero speed. The brake action is synchronized with the clutch; when the clutch engages the brake disengages and remains free while the press is in motion, resulting in a saving of horsepower, also increasing the life of the brake lining by 500%, due to the elimination of brakedrag.

The clutch is cam controlled. No pins



are used, for the cam is mounted on the crankshaft which works the throwout yokes resulting in a positive clutch action. The 70 ton press main bearings are  $4\frac{1}{2}$ "; connection bearing 6"; standard stroke  $3\frac{1}{2}$ "; (longer stroke can be furnished) bolster plate  $22" \times 32"$ , weight 11000 lbs. Write:

The Superior Punch Press Co.  
3610 Superior Ave., Dept. BB  
Cleveland, O.



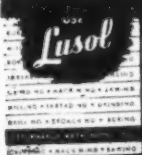
# MEMO

FROM GENERAL MANAGER

☐ PRODUCTION ☒ TOOL DESIGN  
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*Carbide tools O.K.  
 but cooler operation  
 will cut costs. Try the  
 new Lusol coolant  
 we saw at Chicago  
 Show.*

*Get test sample  
 from Anderson Oil Co  
 Portland, Conn.  
 G. M.*



**TRY  
 LUSOL**

WRITE FOR DATA BOOK

**ANDERSON OIL CO.**

**712 BROWNSTONE AVE.**

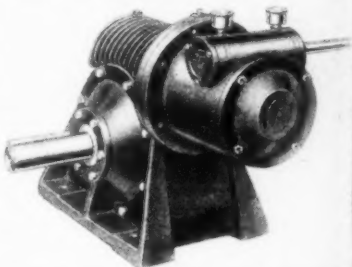
**PORTLAND, CONNECTICUT**

**MAKERS OF RUSTAVOID**

# Janette

## Speed REDUCERS

Motorized or Motorless

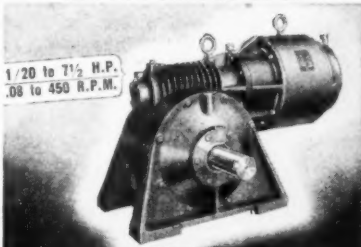


JANETTE Offers the Manufacturer of slow speed machines a large variety of sizes and types of **EITHER MOTORIZED or MOTORLESS** speed reducers. They are compact, pleasing in appearance, ruggedly constructed, with ample sized gears, shafts, bearings and bases to insure many years of trouble free service.

**SPEED REDUCERS** provide a practical, simple method for obtaining slow speeds from efficient, high speed motors, without using chains, sprockets, belts, pulleys or exposed gearing.

**JANETTE** build their own motors which are especially designed for driving speed reducers. Because of the large variety of reducers available, **THERE IS A SIZE AND TYPE FOR ALMOST ANY COMMERCIAL APPLICATION.**

**ASK FOR CATALOG 22-27**



**Janette Manufacturing Company**  
 556 W. Monroe St. Chicago 6, Ill.

**SIMPLY TAP YOUR  
PRESENT AIR LINE  
AND INCREASE  
PRODUCTION WITH  
AIR-HYDRAULIC  
PRESSES**

*No other press  
does so many  
jobs so well!*



**2½ & 6 TON CAP.**



**ASSEMBLING** — Laminations and rivets squeezed at one stroke. Steady controlled pressure prevents distortion.



**CRIMPING** — 4 crimps made at one stroke with no damage to plastic base in assembly of radio tube.



**ASSEMBLING** — Worm pressed over knurled spindle on venetian blind hardware.



**BROACHING** — 8 slots broached at one stroke on plastic base. Broaching, slotting and piercing operations on plastics performed easily on A-H Press.



**RIVETING** — 3 tubular rivets in ceramic base "squeezed with speed" at one stroke. Eliminates danger of damage to ceramic.



**FORMING** — Field coil squeezed into concave shape from flat. Only a squeeze assures perfect, uniform work, free of tape breakage.



**STAKING** — Multiple staking operation on metal and bakelite radio volume control.

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**EXCLUSIVE DEALERSHIP AVAILABLE**



**AIR-HYDRAULICS, INC.**

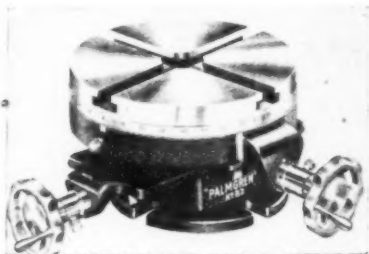
Patented: CHESLA & NICHOLSON

Sales Office: 401-D Broadway, N. Y. 13

## MILLING SIMPLIFIED WITH NEW CROSS SLIDE TABLE

A new Palmgren No. 82 Indexing and Cross Slide Table with graduated rotary top has been added to the 83 line announced by Chicago Tool & Eng. Co.

The table top is graduated for full 360°. It can be rotated manually or locked securely in any desired position. The table is 8" in diameter and "T" slots are provided for convenient mounting of parts and fixtures. The cross travel is accomplished by feed screws and is calibrated accurately in thousandths. Adjustable gibs are provided for take-up



due to wear. A maximum travel of 4", plus the 360° rotation of the 8" table top, makes this tool adaptable to many operations.

The base has four convenient bolt and key slots for rigid mounting to the table of the milling machine, drill press, shaper, or surface grinder. Full information can be obtained by asking for Bulletin No. 10 from:

**Chicago Tool & Engineering Co.**  
Dept. BB, 8383 South Chicago Ave.,  
Chicago 17, Ill:

## ALUMINUM CASTINGS

QUALITY, APPEARANCE & PRICE

Write or Phone

**ARCANUM ALUMINUM FDY.**

8430 Grand River Ave.

TY 7-6733, Detroit 4, Mich.

# **FASTER PRECISION SURFACING**

*and* **BETTER FINISH**

## **with PORTER-CABLE**

### **ABRASIVE BELT MACHINING**

*It's 2 to 25 times faster on many kinds of surfacing operations in production, assembly, job and tool shops*

**MACHINES FLATS**

**GRINDS CONTOURS**

**GENERATES RADIUS**

**GRINDS TRUE BEVELS**

**CUTS TRUE ANGLES**

**DOES CENTERLESS GRINDING**

**SURFACES, POLISHES AND BURRS**



- ✓ Abrasive Belt Machining often saves 75% to 90% in set-up time
- ✓ Cuts polishing time 30% to 50%
- ✓ Eliminates wheel dressing, wheel loading
- ✓ Eliminates truing and balancing in centerless grinding
- ✓ Works on most metals, plastics, glass, etc.
- ✓ Does many jobs now done by millers, shapers, etc.

## **THERE'S A PORTER-CABLE SURFACER FOR EVERY JOB**

# PORTER-CABLE SURFACER

## BG-8 WET BELT SURFACER



A money-maker in any shop! Belt runs cool . . . does not load . . . grinds 2 to 25 times faster on many operations.

This high-speed, precision machine works an entire area at once . . . machines interrupted areas flat and square in one pass.

Since cutting pressure is in one direction, it requires simplest fixtures. Automatic feed table permits quick set-up, load and unload. Operates while next job is being set-up. Saves from 55% to 75% table time.

Machines flat, grinds true bevels, generates radii, cuts true angles, gives final finish while taking cut. Operates on most materials without heat, distortion, etc. Ideal for big and small manufacturers . . . production line . . . tool rooms . . . machine shops.

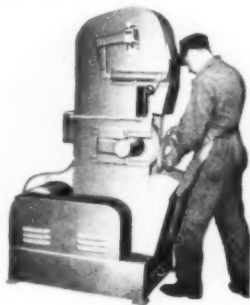
## NEW C-6 CONTOUR GRINDER-POLISHER

The NEW C-6 eliminates costly set-up time and wheel dressing . . . reduces fatigue . . . cuts polishing time by 30% to 50% . . . improves the finish and quality of your work . . . grinds a larger variety of shapes in less time.

For flat-face grinding or polishing you merely use the unshaped contact roll.

For contour grinding the shape you want is easily turned into the sisal-latex material of the contact roll. The belt drapes itself into the contour.

The Contact Roll holds its shape indefinitely. Runs true, since it is not on the drive pulley. It is not shaken by motor vibration. Furthermore, it is adjustable to travel the belt at any angle from 0° to 15° off tangent. This makes possible a large variety of shapes and contours.



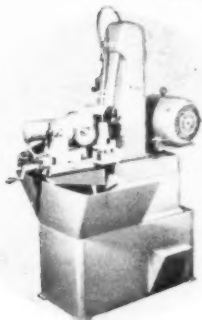
Abrasive Belt is evenly loaded . . . does not over-heat . . . actually does all the cutting work. Does not require dressing . . . easily replaced in a few minutes.

**The NEW C-6 builds bigger profits!**

ABRASIVE BELT MACHINING BOOSTS PRODUCTION

# DO MORE JOBS—FASTER, BETTER!

## PORTER-CABLE L-4 CENTERLESS BELT GRINDER



Saves 75% to 90% of set-up time. Eliminates truing, balancing and continued wheel dressing.

The L-4 Centerless Grinder is a high speed, precision machine . . . quickly set up by any mechanic. Change of abrasives is done in just 2 minutes without balancing or truing. Operates economically on short or long runs, takes stock from  $\frac{3}{32}$ " to  $2\frac{1}{4}$ " diameter.

Since the Contact Roll is behind endless abrasive cutting belt, it is not subject to wear . . . always has a flat, smooth, true-running surface and square edge. Does not nick, round or chip. Its resilience eliminates chatter . . . compensates for irregularities of stock.

Any small or large shop can afford the L-4, now sold at a revolutionary low price!

## ABS BACK-STAND IDLER

Converts your old grinding jacks into FAST belt grinders and polishers . . . boosts the output of polishing and grinding jobs . . . cuts cost of production . . . reduces operator fatigue. Evenly loaded belt, with particles as hard as diamonds, does all the cutting. Requires very little pressure. Makes smooth finish without scratches or deep digs to polish out later. Long belt is always cool.

Model shown is the floor type; also made in CBS model for wall mounting when floor space is at a premium.



READ WHAT PRODUCTION MEN SAY ON THE NEXT PAGE..

## MAIL THIS CARD TODAY!

**Porter-Cable Machine Co.  
Syracuse 8, N. Y.**

Please send me the following — without charge or obligation:

- ☐ Further information on Abrasive Belt Machining.
- ☐ 16 MM Movie Film — "Machine of the AGE" (Loan free).

## TAKE ADVANTAGE OF THIS FREE OFFER

Send us your drawings or a sample of your work. Our engineers will make a Methods Analysis and recommend lowest cost finishing and grinding operation.

Name of Company.....  
Address.....  
City..... State.....

ABRASIVE  
BELT  
MACHINING  
BUILDS  
BIGGER  
PROFITS!

## READ WHAT PRODUCTION MEN SAY ABOUT PORTER-CABLE ABRASIVE BELT SURFACERS...



✓ **Does the work of big machines** "The Porter-Cable BG-8 with Automatic Feed Table replaces six millers."

✓ **Does precision machining** "We are grinding springs in a fixture that grinds 63 springs at one time . . . ground to a feather edge so as to be within the load limits of a shadowgraph."

✓ "... quality of work is unsurpassed."

✓ **Increases production** "... increased our production 30% to 35% . . . cut rejects to only 2 in 18 months . . . as compared with 20% to 25% rejects."

✓ **Better Finish** "... finish completely acceptable, so much so that price increase of \$5 a unit was accepted."

✓ **Versatile** "... one of the most versatile tools we own." Many operations done free-hand; many with simple fixtures only.

✓ **Low-cost operation** "... belt cost so little I don't bother to keep track."

✓ **Saves labor on tool room jobs** "... one of our best labor savers on squaring die blocks, establishing radii, polishing dies, etc. What we did by milling, hand filing and scraping we now do by wet-belt grinding and save hours of labor."

**See the Porter-Cable Surfacers in actual operation! Send for our movie film today! Loaned free**

FIRST CLASS  
Permit No. 9  
(Sec. 510, P. L. & R.)  
Syracuse, N. Y.

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**PORTER-CABLE MACHINE CO.**

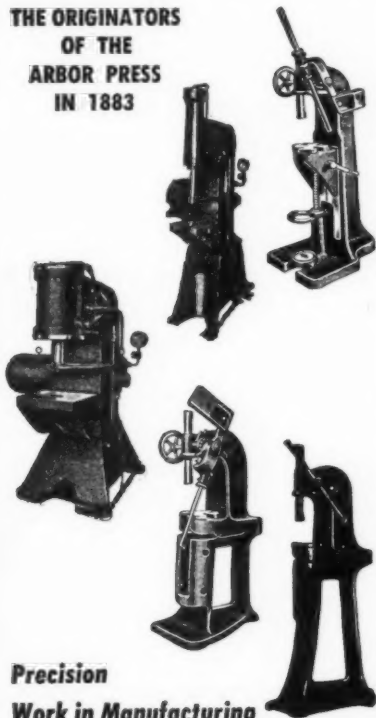
**300-2 Exchange St.**

**Syracuse 8, N. Y.**

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NOW!**

**FOR ASSEMBLY, BENDING  
★ AND BROACHING ★  
1883 - GREENERD - 1947**

**THE ORIGINATORS  
OF THE  
ARBOR PRESS  
IN 1883**



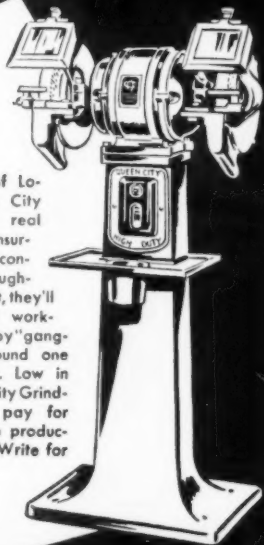
**Precision  
Work in Manufacturing**

An Arbor Press for every need, ranging from  $\frac{1}{4}$  to 30 tons capacity, both hydraulic and mechanical types. Write for Catalog G.

**GREENERD ARBOR PRESSES**  
NASHUA, NEW HAMPSHIRE, U.S.A.  
EST. 1883

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**with rugged  
QUEEN CITY  
GRINDERS**



A battery of Lo-Cost Queen City Grinders is real production insurance. Placed conveniently throughout your plant, they'll stop wasted work-hours caused by "ganging up" around one lone grinder. Low in cost, Queen City Grinders quickly pay for themselves in production gained. Write for Catalog.

**QUEEN CITY  
MACHINE TOOL CO.**

**217 E. Third St.  
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*to extreme accuracy*



The volume and variety of form-tools made by J & S during our long experience, have developed a "tool sense" that assures our customers the best in accuracy and quality. Among the types we produce are: Counterbores, Circular Form Tools, Hollow Mills, Gun Drills, Flat Drills, End Cutters, Boring Tools, Step Drills, Watch Tools, etc.

Get your form-tools right the first time by sending your specs. to J & S.

Visit us at Booth 426, A.S.T.E. Convention, Cleveland, Ohio.

**J & S TOOL CO.**

471 Main Street, East Orange, N. J.

Representatives in Principal Cities

## QUICK ACTING DEMAGNETIZER

The Machine Tool Division of Welch Industries announces an ingenious new product, the Demagnetizer. This accessory is a necessity in the operation of magnetic chucks, since by one pass through the opening of the Demagnetizer the part being processed becomes immediately demagnetized. The thoroughness of the process is also claimed to give added precision to the finished part. The unit is actuated by a foot switch which facilitates operation and eliminates danger from overheating. Complete details are available upon request to:

Welch Industries, Mach. Tool Div.  
19400 W. Eight Mile Road  
Detroit, Mich.

## NEW FEATURES OF MILWAUKEE DIE FILER

The latest model of this bench-type, reciprocal filing machine includes a number of advancements which result in operating advantages and finer workmanship.

A new universal type chuck results in a higher degree of precision workmanship. It permits adjustment to compensate for crooked or warped shanks on files or lapping stones, assuring absolute perpendicular movement and straight-line, flat-surface cutting action.

The safety belt-guard which was formerly available as an accessory is now included as standard equipment on the Milwaukee Die Filer. For further particulars write:

Milwaukee Chaplet and Mfg. Co.  
Dept. BB, Milwaukee, Wis.

## MP TOOL & ENGINEERING CO.

An adjustable tooth form which serves as a gear and spline gage is mentioned in a "What's New" write-up on pages 276-277 of the January **MACHINE AND TOOL BLUE BOOK**. The address of the manufacturer is: MP Tool & Engineering Co., 2339 Caniff St., Detroit 12, Mich.

## NELCO TOOL CO. ANNOUNCES MOVE

The Nelco Tool Co., Inc., manufacturers of tungsten carbide milling products, announces that it has moved from Brooklyn, N. Y. to a new plant recently purchased at 266 Center St., Manchester, Conn. Key personnel and a majority of the employees made the move with the company; operations in the Manchester factory are now in full swing.



## ANNOUNCING New Erickson-State Boring & Reaming Tools

Erickson adds precision methods to the manufacture of these proven, widely known, production tools. The patented State 4-cutter principle permits heavier feeds at higher speeds and delivers more pieces per grind than single-point or double-cutter tools. More regrinds; less adjusting time; accurate, clean holes.



Write for our catalog.



Sizes for range of 1-1/16" to 5 1/2" Ask for our Bulletin "T-2"

Also, the Erickson-State adjustable core drill for heavy duty applications involving excessive chip problems. A heavy hogging, chatterless replacement for fixed core drills. Fast operation and accurate, uniform results realize a new low cost per hole. Sizes for range of 1 1/8" to 5 1/2".

Learn how these two companion Erickson-State tools can cut costs for you. They can be adapted to many special requirements up to 5 1/2" boring diameter. We shall be glad to design special bars.

Made by

**ERICKSON TOOLS  
DIVISION**

2310 Hamilton Ave.  
CLEVELAND 14, OHIO

## New Electronic ROGERS NT-20 FACE GRINDER

from SLOW TRAVERSE . . . . . 5 ft. per minute  
to FAST TRAVERSE . . . . . 70 ft. per minute

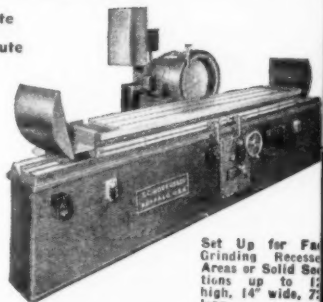
ELECTRONIC CONTROL, operated from a single dial, makes for ultimate knife grinding accuracy. A wide range of speeds can be preset or changed while running. Reversing, quick stopping and complete control at all times are automatically provided for. All vibration noise or shock at reversals is eliminated.

Write for literature describing Rogers NT-20, the first machine of its kind.

Pioneer Knife Grinding Manufacturers for  
Over 60 Years

**SAMUEL C. ROGERS & CO.**

207 Dutton Avenue Buffalo 11, N. Y.



Set Up for Fast  
Grinding Recess  
Areas or Solid Se  
tions up to 12  
high, 14" wide, 7  
long.

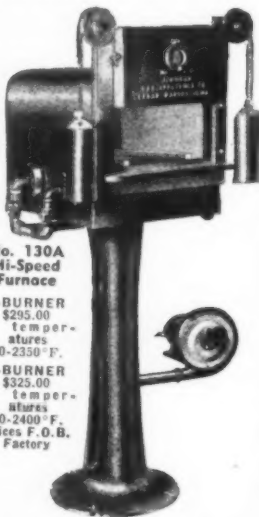
# ROGERS KNIFE GRINDERS

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# Quick Acting JOHNSON FURNACES

## CUT HEAT-TREATING COSTS SAVE TIME WITH JOHNSON

For quick, accurate heat-treating high speed steels, dies and tools. Reaches operating temperatures FAST to save time and gas. Counterbalanced door opens upwards. Firebox 7 $\frac{1}{4}$ x13x16 $\frac{1}{2}$ . Complete with Carbofrax Hearth, G.E. Motor and Johnson Blower.



No. 130A  
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Furnace

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\$295.00  
for temper-  
atures

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JOHNSON GAS APPLIANCE CO.

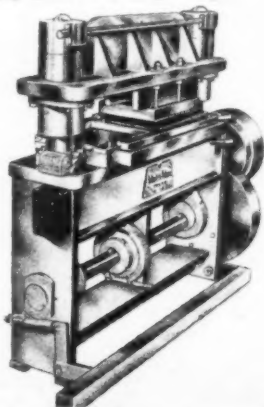
570 E Ave. N. W., Cedar Rapids, Iowa

## NEW PRODUCTION LINE PRESS

Parker Manufacturing Co. introduces known as the Multi-Max Press. Mechanically operated, it shears, blanks, notches, punches, perforates, slots, pierces, lances, bends and forms sheet metal parts in multiple unit, with one operator.

It needs no special foundation, has no overhanging parts and requires only 36" x 75" floor space. Because of its small compact size, it is easily picked up and moved in and out of the production line.

The Multi-Max is of all steel plate welded construction, normalized after welding to relieve all stresses. Stroke is 2", as is the ram adjustment. Shut height is 10". The stroke is down, the adjustment up. Bed die space is 12" x 36"; ram die space is 10" x 36". Bed opening, 5" x 32". A 1 $\frac{1}{2}$  h.p., 3 phase motor is furnished with each press, capable of producing 100 strokes per minute.



Bed is 32" from floor, overall height is 57". Shipping weight is 3250 lbs. approx. With proper sets of dies, combination shearing, blanking, punching and forming operations are economically performed with one operator for long production or short fill-in runs. For further information, write:

Parker Manufacturing Co.  
2200 Colorado Ave. Dept. BB  
Santa Monica, Calif.

# 6 SPEEDS

## FOR DIE AND MOLD FINISHING



Haskins Type CH-4 Flexible Shaft Machine.

Whenever die and mold finishing operations are performed over extended areas—or wherever an overhead unit is needed, versatile Haskins CH-4 Flexible Shaft Machines can speed production. Operating equally well from fixed or trolley suspension, the portable ½ HP air jacket motor, with the Timken countershaft, develops six speeds (as high as 7800 r.p.m.)—can be used with grinding wheels up to 4" diameter.



See what Haskins machines can do for you. Write today for details. R. G. Haskins, 2645 W. Harrison Street, Chicago 12, Ill.

# haskins

**FLEXIBLE SHAFT EQUIPMENT**

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## ARTUS ARBOR SPACERS

The COLOR tells the THICKNESS

ARTUS Arbor Spacers made of plastic in various colors identify thickness at a glance! .001, .0015, .002, .003, .005, .0075, .010-.030. Speed up accurate fitting at low cost. Write for folder



CONVENIENT TRIAL OFFER

Handy Spacer Assortment

10 ea.	.001 — .0125 thick
5 ea.	.015 — .030 thick

100 SPACERS IN ALL

¾" — \$3.10	1¼" — \$3.80
1" — 3.35	1½" — 4.70

Other standard sizes also available.

## ARTUS PLASTIC SHIM

AND

**FEELER GAUGE STOCK**



The COLOR tells the THICKNESS

• Each thickness a distinctive, easy to identify color. Impervious to oil. Long lasting 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together..... \$4.25

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## ABRASIVE BELT MACHINE POLISHES CONTOURS AND FLATS

The Porter-Cable Model C-6 Belt Grinder and Polisher for contoured and straight-faced grinding is a recent addition to this firm's line of abrasive belt machines. The grinding and polishing of contours and the maintaining of a sharp, fully machined pattern, has heretofore been an obstacle to the full application of abrasive belt grinding, until the development of the Model C-6. In this machine, the flexed abrasive belt approaches and leaves the formed contact roll at a slight angle; it shapes itself into the pattern, and grinds or polishes that pattern sharply, with speed and economy. The unit is not confined to polishing contours or irregularly shaped work pieces, but can be used on surface grinding and polishing operations.

Model C-6 includes a contact roll located between the drive and idler pulleys. The contact roll is mounted on a rack, adjustable in order to permit the belt to travel at any angle from zero to 15° off tangent. This feature provides a more efficient method for handling flat or straight surface operations. The contact roll serves only as a back-up for the abrasive belt, and is not a driving unit, therefore heat and friction are eliminated. The C-6 is a completely self-contained unit; belt guards, dust trap, and exhaust connection all built in.

The contact wheel installation is provided with a 3 to 6" face x 16" dia. wheel. The 1½" dia. spindle is mounted on heavy duty ball bearings provided with a locking device to facilitate changing contact wheels.

The spindle housing is mounted on slides, and is adjustable 6¼"; in forward position, it is suitable for straight and

flat grinding; the aft position is for curved surface grinding. The surface speed of the belt is constant, thus a larger or smaller contact roll may be used without affecting the speed of the belt.



Complete details and specifications of the Model C-6 are available. Ask for Bulletin No. 660.

**The Porter-Cable Machine Co.**  
300-1 Exchange St.  
Syracuse 8, N. Y.

## AUTOMATIC LATHE TURNING

(Not Screw Machines)

CENTER & CHUCK WORK—on 8" and 12" DIA. FAY AUTOMATIC LATHES—CASTINGS—SHAFTS—PISTONS—CRANKS, ETC. — 100-1,000,000 pieces

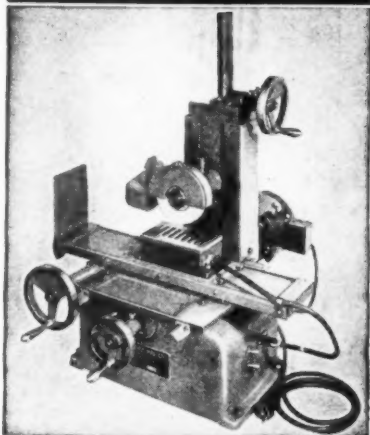
**ACE ENGINEERING & MACHINE CO. INC.**

3644 N. Lawrence St.

K. R. Fay, Pres.

Philadelphia 40, Pa.

# SANFORD



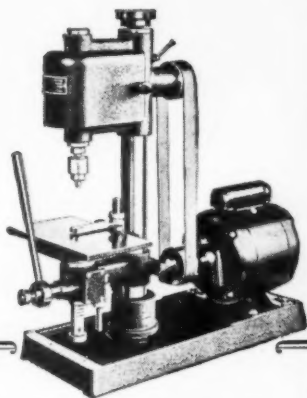
## High-Speed BENCH SURFACE GRINDER

ACCURATE WITHIN .0001

A sensitive machine built to rigid standards of accuracy and workmanship specially designed "For the job that fits in your palm."

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**SANFORD MFG. CO.**  
1020-28 Commerce Ave.  
Union, N. J.



## INSTRUMENT TAPPER (SUPER-SENSITIVE)

The Hamilton Super-Sensitive Tapping Machine is designed for the precision industries. Tapping capacity, from the smallest and finest tap to 10-32 inclusive.

This machine has every wanted feature. Ease of operation. Height adjustable table. Adjustable stops. Ample clearances and travel. Silent and clean in operation.

Patented power transmission permits centering of tap without cutting and tapping to the very bottom of blind holes without tap breakage.

Our Bulletin T-47 gives the story and specifications complete. Write for it.

SUPER-SENSITIVE DRILLING AND TAPPING MACHINES - PORTABLE TAPPERS



THE  
*Hamilton*  
TOOL COMPANY

824 5th NINTH STREET - HAMILTON - OHIO U. S. A.

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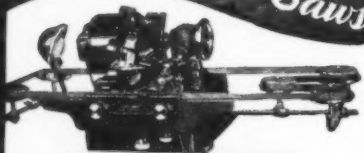
## The Very Best Facilities for Die Cut

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In short runs  
Phone factory engineers in  
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Or Write  
**MINNEAPOLIS 7, MINNESOTA**  
**DAYTON ROGERS**  
*Manufacturing Company*

*Recondition ★ Old Saws ★*

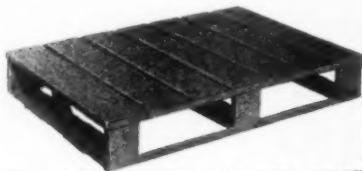


*With the* **HOWE LINDSEY  
AUTOMATIC  
SAW SHARPENER**  
• HACK SAWS  
• BAND SAWS  
• CIRCULAR SAWS  
• MEAT SAWS

**HOWE AND SON** Inc.  
HINSDALE N. H.

## ALL-METAL 4-WAY PALLET

A new all metal four-way pallet which is constructed of special corrugated rolled steel, welded throughout for rigidity and endurance is announced by the Palmer-Shile Co. It is built with beveled edges on two sides to permit trucks to ride over easily. The pallet has special rolled channel steel face, with center brace for extra weight loads. It is designed for use with power lift and hand trucks.



The manufacturer builds pallets any gauge, size or weight capacity to meet specific requirements or design to customers' specifications. For information, write:

**The Palmer-Shile Co., Dept. BB.**  
16021 Fullerton Ave.  
Detroit 27, Mich.

## PULLER LIFTS 76 TIMES OWN WEIGHT

The Coffing Hoist Company's new puller lifts 500 lbs., easily in spite of its handy size. The tool is designed to save time and eliminate back-breaking effort of men on lifting, pulling or stretching jobs. It has a rated capacity of 500 lbs. but its chain has a tensile yield of 2,000 lbs. and its snap hooks a tensile yield of 3,000 lbs.

As an added safety factor, it has a "safety load" handle designed to bend at about 800 lbs., a level well below the yielding point of any other part of the puller. Weighing a mere 6½ lbs. (with chain), this midget puller features a two-way handle that can be used as a high speed crank or a ratchet lever. It is so compact with the chain coiled up it fits neatly into even a small tool box.

The midget puller requires only 28 lbs. of effort to result in a 500-lb. pull. For information write:

**Coffing Hoist Co., Dept. BB.**  
Danville, Ill.

## ACROMARK ENGRAVED ENAMEL-FILLED SIGNS

Engraved brass, aluminum or stainless steel signs with letters engraved to .020" depth and filled with any desired color of baked enamel, fitted in new slide type wood or metal frames are now being made by The Acromark Co. The new development permits erection of the frame by means of screws or bolts after which the metal signs are slid into position and locked.

Engraved names may be long because condensed lettering and any design may

be engraved within available space. Slide type frames are made with any number of channels to receive signs of as many names as desired. Of interest to industrial offices housing the headquarters of several companies, these signs denote dignity and products of quality. Further information will be submitted upon application to:

The Acromark Co., Dept. BB  
15 Morrell St.  
Elizabeth 4, N. J.

## DO TURRET LATHE JOBS

on your 9" to 16" engine and bench lathes with ENCO Self Indexing Hexturrets.

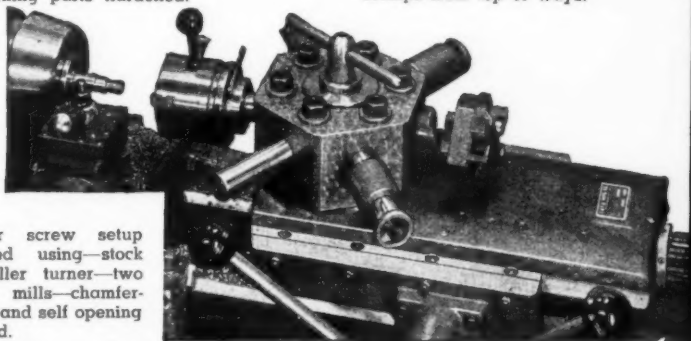
### ACCURATELY

AND

### QUICKLY

Double gibs.  
Double drive gears & racks.  
Ground & spotted slide ways.  
All working parts hardened.

Smooth and Sensitive control with pilot wheel drive.  
Easy stop screw adjustment.  
Clamps from top of ways.



Shoulder screw setup illustrated using—stock stop—roller turner—two hollow mills—chamfering tool and self opening die head.

**Model—425**  
1" tool holes  
4 1/4" stroke  
**Price—\$275.00**

**Model—651**  
1" tool holes  
6 1/2" stroke  
**Price—\$350.00**

**Model—650**  
1 1/4" tool holes  
6 1/2" stroke  
**Price—\$400.00 to \$475.00**

Model 425 available for Atlas, Logan, Clausing, South Bend 9" and 10" Sheldon 10", 11", and 12", Craftsman 12", Powr Krait 10" and Sebastian 12".  
**Delivery 2 weeks**

Model 651 for all above lathes except South Bend 9".

**Delivery 2 weeks**

Model 650 for South Bend 13", 14 1/2" and 16", Regal 13", 15" and 17" and Sebastian 14" and 16".

**Delivery 2 to 6 weeks**

We can furnish an Enco Hexturret for most all bench or engine Lathes with from 9" to 16" swing. Write for catalog and quotation.

**ENCO MANUFACTURING COMPANY**  
**Dept. 22 4522-24 W. Fullerton Avenue Chicago 39, Ill**

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## A REAL HELPING HAND

It's a help that die makers, tool makers, machinery builders and general machinists have long sought—a more accurate and surprisingly faster way of transferring blind screw holes.



The Heilmann Transfer Screw Set is a self-contained, complete tool. No wrenches or pliers are necessary. Made in  $\frac{3}{16}$ " to 1" diameters. Send for pricelist.

**HEIMANN MFG. CO.**

332 Lincoln Ave.

Urbana, Ohio

## TESTING MACHINE CHECKS 800 PIECES PER HOUR

A Brinell Testing Machine capable of checking up to 800 pieces per hour of parts varying in diameter and thickness as much as  $\frac{3}{4}$ " without moving the elevating screw, is announced by Steel City Testing Machines, Inc. This machine, model KDR, is motor driven, hydraulically operated and so constructed that it is impossible for the operator to remove the specimen being tested before the full load has been applied to the penetrator. The load is held for a pre-determined time cycle (adjustable from 2 to 15 seconds duration) after which time the penetrator automatically reverses itself to starting position, ready for the next test.

Specimens or parts which are alike in thickness or diameter within  $\frac{3}{4}$ " may be tested without moving the elevating screw, with a resultant saving in time. This machine is equipped with a comparator indicator which eliminates the necessity of a microscope on production testing. It can be furnished with a foot or knee type starter switch. The throat opening is 6" and maximum vertical

opening is 14". Standard equipment includes flat and Vee-type anvils. For further information, write:



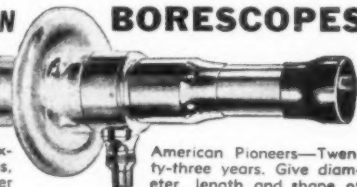
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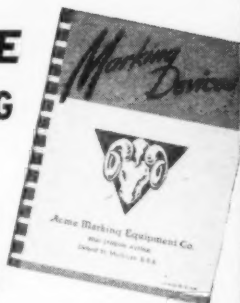
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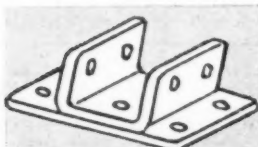
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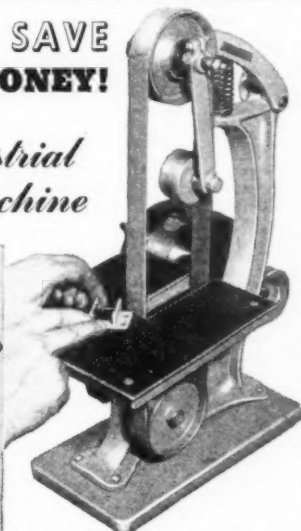
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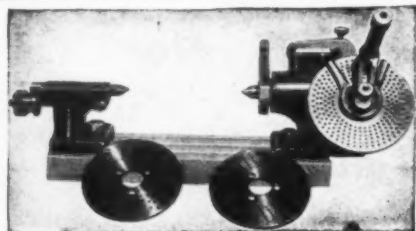
In our page advertisement in the January issue of Machine and Tool Blue Book it was erroneously printed that the H. S. Drill Sets, above, contained 39 drills. This should have been 29 drills.

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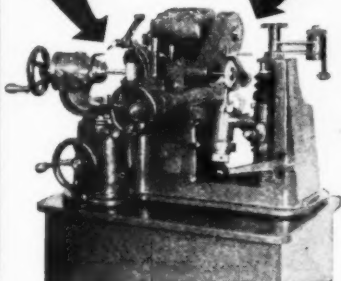
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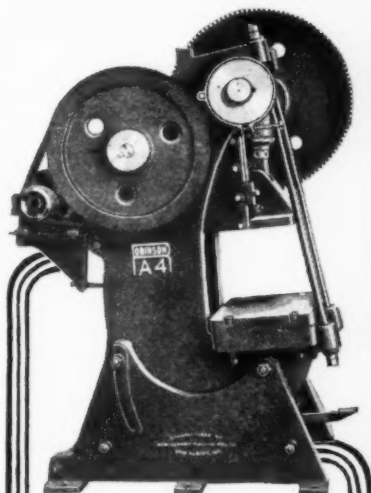


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With this new Victor Wall Chart near the tool crib or in your machine shop, it takes only one look to find the one blade that's best for the given job. And, once you use it, all jobs can be performed much faster, with fewer rejects and broken blades.

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It's all yours, too, absolutely FREE. Simply write on your letterhead to your Victor supplier or to the address below. *The supply is limited.*

This is but one of the many helps offered by Victor supplier. He is the right man to see for the right blade. He has the complete Victor line—a blade for every job a hack saw or a band saw can do. No matter what you cut in the way of metals, plastics, or other non-metals—there's a Victor blade to cut it faster, cleaner, and last longer. See your Victor supplier for the best blades.

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Makers of Hand and Power Hack Saw Blades, Frames and Band Saw Blades

## NEW STANDARD ELECTRIC BENCH GRINDER

The Standard Electrical Tool Co. announce that they have added the Type 4LAS4 to their Cadet line of Grinders. This Bench Grinder is equipped with a 1/3 h.p., 3600 r.p.m. totally enclosed motor for 110 volt, single phase, 50 or 60 cycle, and it can be furnished to order for 220 volt single phase. It is furnished with ten feet of three conductor No. 16 rubber covered cable with two prong attachment plug, one wire for ground. The safety type enclosed guards each have an exhaust outlet, adjustable spark breaker and work rest. A double pole toggle switch is located in the base.



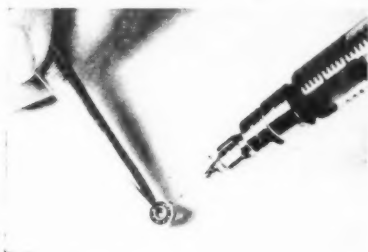
The machine is furnished with two 6" x 3/4" x 1/2" grinding wheels. The distance between wheels is 16" and the height to center of spindle is 6 3/4". Net weight 60 lbs. Safety glass eye shields are available to order; the unit can be assembled with a floor pedestal which has tool tray with removable water pot. For complete specifications, write:

**The Standard Electrical Tool Co.**  
2486 River Road  
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## SMALLEST NON MAGNETIC, NON- CORROSIVE BALL BEARING

Here, it is claimed by New Hampshire B. I. Bearings, Inc., is the smallest fully-ground non-magnetic ball bearing in the world. Made to the standard dimensions 1/4" O.D. x 5/64" bore x 3/32" width, this new Micro Ball Bearing was developed for electrical, electronic, geophysical and similar applications requiring freedom from magnetic influences, as well as for general use where non-corrosive properties are important. Material is Beryllium-Copper, preci-

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7 also available) and are of full-face design for maximum capacity.

Further details on request from:

New Hampshire Ball Bearings, Inc.  
Dept. BB, 5 Micro Circle  
Peterborough 1, N. H.

#### HIGH SPEED STEEL REAMERS

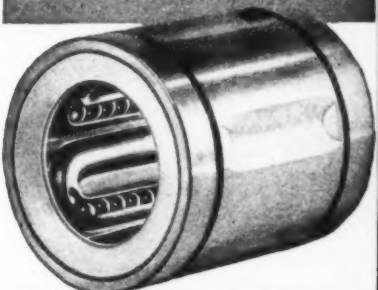
A new procedure for the making of standard and special High Speed Reamers, where the cutter blades of high cost high speed steel are secured in recesses of a tool body of low cost carbon steel, by means of a patented rolling process, is announced by U. S. Tool and Mfg. Co. This process involves no application of heat as in welding or brazing, which deteriorates the temper, hardness, and durability of cutter blades.



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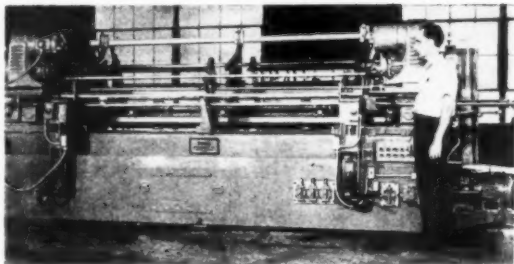
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## END MACHINING OPERATIONS ON PIPE, TUBES AND BARS WITH PINES PROFILING MACHINE

The Pines Engineering Co., has developed general duty, automatic profiling machines for high production end-machining operations, such as: turning, boring, chamfering, burring, threading, tapping, etc., on the ends of pipe, tubing, bars and fittings. On one production job, the Pines Profiling machine chamfers both ends of  $\frac{1}{2}$ " conduit, 10" long, at the rate of 800 to 1000 pieces per hour; and the same machine is used to simultaneously chamfer both ends of screw machine rod stock at the rate of 700 to 900 pieces per hour.

Profilers are built for either manual or fully automatic operation. Automatic types are equipped with hydraulic controls which repeat the machining sequence continuously. With the work hydraulically chucked, one or both ends



are machined by the action of rotating heads, which hold the cutters. One operator can attend several machines.

Either one or two heads are employed on Pines Profilers. Two heads, however, permit the simultaneous machining of both ends of the work, resulting in higher output. The machining cycle is reduced, with extra handling of the

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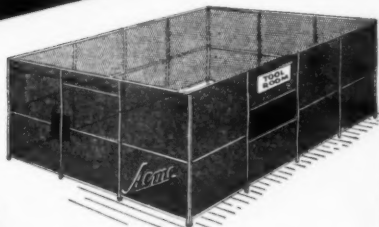
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work eliminated. In addition, the use of two heads on one machine often performs the same function required of two single spindle machines.

Some applications are used to machine work less than an inch in length; others just as readily handle lengths up to 60 feet. Chute or magazine fed machines are used for maximum lengths up to 24" long. Reel fed machines are used for work in lengths over 24" long. When a range of work under and over 24" must be handled, a single spindle machine is usually used to work one end at a time. When desired, Pines Profilers are equipped with automatic conveyors. Catalog showing case histories available from:

**Pines Engineering Co. Dept. BB,  
Aurora, Ill.**

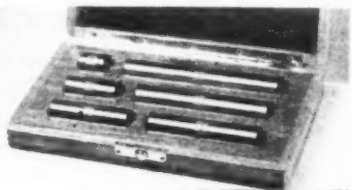
#### **MICROGAGES FOR SETTING LARGE MICROMETERS**

The Van Keuren Co., have introduced a new set of Microgages, No. M 21, designed for setting large micrometers.

The set includes 1", 2", 3", 4", 5" and 6" microgages, which are  $\frac{7}{8}$ " in diameter. Microgages up to 1" are held within a tolerance of plus 12 millionths and minus

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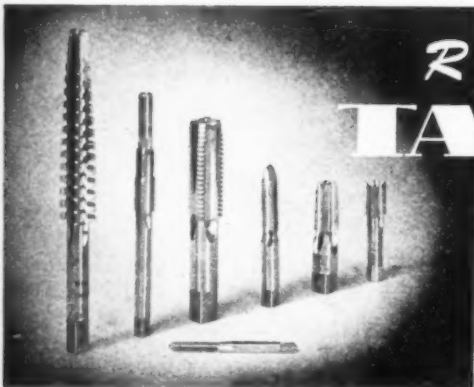
The  $\frac{7}{8}$ " diameter provides proper rigidity for the long gages and also a large surface area which greatly assists



in holding long combinations together. The  $\frac{7}{8}$ " body diameters are ground true cylinders and the end surfaces are held square with the body within close limits.

The set will make combinations up to 21" and is furnished in a solid mahogany case. For additional details write:

**The Van Keuren Co. Dept. BB  
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manufacturers of TAPS AND REAMERS  
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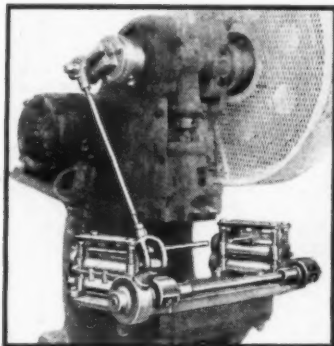
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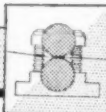
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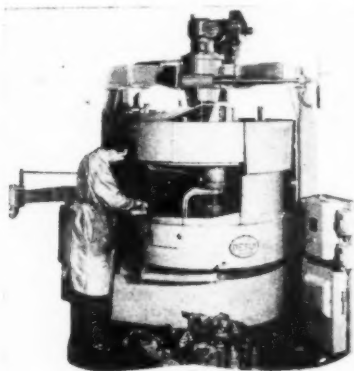
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**UNIVERSAL ENGINEERING CO.**  
**FRANKENMUTH • MICHIGAN**

## NEW 72-INCH VERTICAL SPINDLE GRINDER

Charles H. Besly and Co., have recently expanded production on a new type 72-inch Vertical Spindle Grinder originally designed for grinding cast iron gear housings.

The new grinder, listed as No. 372-72", features a power-driven rotary fixture into which the operator places the casting. The rotating fixture and revolving work holders carry the castings through the grinding cycle at one revolution every 60 seconds, increasing output from 36 to 240 pieces an hour. Four pieces are ground simultaneously. Approximately 1/32" is removed. When smaller castings are ground, two or more can be placed in each work holder.



Readily adaptable to many types of production grinding, the new grinder with its novel use of revolving work holders in a rotating fixture steps up output and quality as compared with the best manual grinding by experienced operators. For detailed information write:

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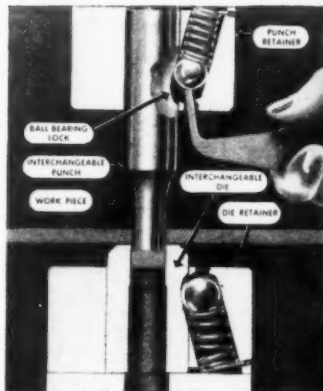
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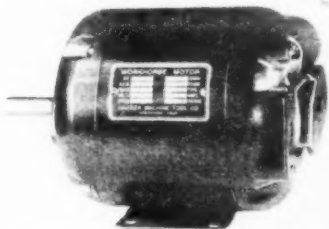
Bay, Inc. Dept. BB  
3903 N. 16th St.  
Philadelphia 32, Penna.

### "WORKHORSE"—THE LIGHTWEIGHT MOTOR

A new electric motor said to be the lightest of its size, rating and capacity is a recent development of Crozier Machine Tool Co. Named the Workhorse, it is a heavy duty type, single phase,  $\frac{1}{2}$  h.p., 115/230 volts. Due to its low slippage, 2 pole develops 3,520 r.p.m., 4 pole, 1,760 r.p.m. It draws 6.8 amps. on 110 volts and 3.4 amps. on 220 volts. The light weight is due to its aluminum end brackets and simplicity of construction. It operates on either 50 or 60 cycles. The weight is 29 lbs. It has a 16 gauge sheet steel case and is lubrication-sealed for life. Having ball bearings throughout, it can be run in any position, op-

erating at 40°C. temperature.

The Workhorse has a welded steel stator frame. The cast aluminum squirrel cage is made by an exclusive Crozier centrifugal casting process. A cooling system constantly circulates air between the frame and the laminations. The



winding is heavy Fornvar insulated wire which is later varnish impregnated and baked. Starting torque is 220% and the motor will withstand a 25% overload indefinitely. Further information available upon request to:

Crozier Machine Tool Co. Dept. BB  
Hawthorne, Calif.



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Stamina  
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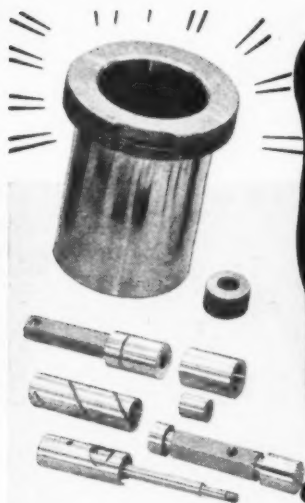
THE NEW  
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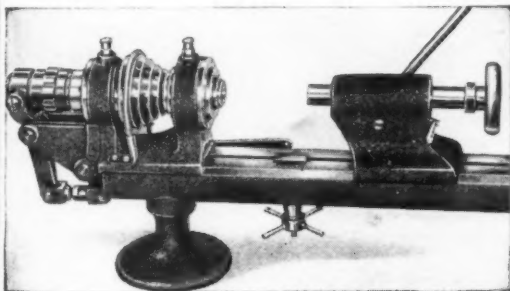
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*Fine Precision  
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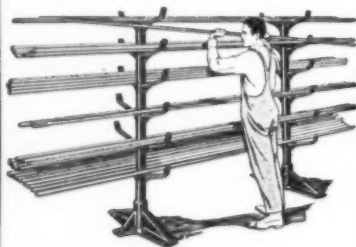
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**F. W. DERBYSHIRE, INC., WALTHAM 54, MASSACHUSETTS**



Each BROWN SECTIONAL RACK combines five major and several minor features of design, all of which save money for its owner. The time previously lost in end-hauling each bar of stock its entire length from the old-style, closed-side Rack is saved by the Brown Rack which requires but a few inches of side movement.



Each length, width and thickness of stock is displayed in Gold-Fish visibility for instant selection and workmen waiting for stock are served without waste of time. The BROWN SECTIONAL RACK is a simple, durable article built in five styles from standard interlocking metal sections. It cannot burn, sag or twist; unattached to the building, it can be moved at will. Changes in length of stock can be met by moving the units nearer or further apart, while increases of stock can be met by simply adding more standard units. Built from metal throughout, depreciation is practically nil. SEND FOR BULLETIN NO. 26-B.

## BROWN SECTIONAL RACK

**BROWN ENGINEERING CO.**

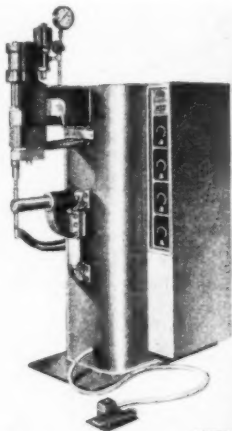
126 N. THIRD ST. READING, PA.

SAWS • VISES • CLUTCHES • COUPLINGS

## SMALL PRESS-TYPE WELDERS OFFER 3-PHASE CONTROL

A new series of press-type welders is announced by Sciaky Bros. Utilizing a standard frame size, these welders offer a choice of 5 power ratings (20, 30, 40, 50, and 75 KVA) and 4 throat depths (12", 18", 24" and 30"). Capacities on mild steel range from .016" up to .125".

If desired, the welders can be furnished with Three-Phase control, which reduces the required power rating by 50% and operates on a balanced three phase load at a power factor of 85% or better. Three-Phase control not only solves power supply problems, but also permits the welding of aluminum, brass, etc., with nominal power supply. This series of small



machines completes a line of spot, seam and projection welders which range in size up to heavy duty machines capable of welding two thicknesses of  $\frac{3}{4}$ " steel with a power demand of only 500 KVA.

Standard features include fully automatic electronic control of the welding sequence; frame of  $\frac{3}{4}$ " steel plate, designed and ribbed to maintain alignment and reduce deflection; special cast and precision machined head with tapered bushings to compensate for wear. The welders are entirely self-contained. Controls are mounted in a hinged side cabinet with dials convenient to operator.

Additional features and complete spe-

cifications are available upon request to:

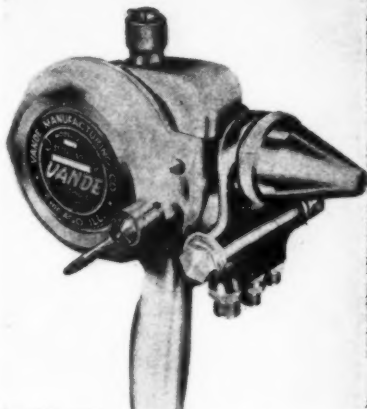
**Sciaky Bros., Inc., Dept. BB**  
4915 W. 67th St.  
Chicago 38, Ill.

#### NEW GUN FOR SPRAYING METALS

The Vande Manufacturing Company's new metallizing gun embodies several exclusive design features.

The gun completely eliminates back-fire. Its nozzle incorporates a new development of mixing the gas and oxygen at the point of combustion. Each wire nozzle is specifically designed to provide the exact volume for the gas used: acetylene, propane, or other gas. No air cap adjustments are needed.

Another feature is the Finger-Tip Turbine Control. Positive turbine control is achieved by a compound turbine containing a rotor and stator responsive to opposing propulsion fluids. One propulsion fluid jet remains in a fixed position in the primary turbine. A second jet is directed by a control lever in the secondary turbine and either reduces or increases the primary turbine speed, thus affording complete wire feed control at all times.

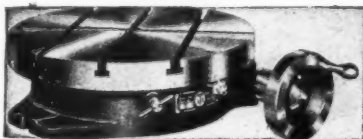


Details and operating features available from:

**Vande Mfg. Co. Dept. BB.**  
1837 S. Michigan Ave.,  
Chicago 16, Ill.

**BRAND NEW  
PRECISION**

## ROTARY TABLES



9"	— \$ 97.00
12"	— 160.00
15"	— 185.00
18"	— 220.00
18"	— 350.00 Extra Heavy Duty
21"	— 500.00 Extra Heavy Duty
25"	— 590.00 Extra Heavy Duty

OUR ROTARY TABLE WILL TAKE THE PLACE OF A COSTLY FIXTURE. IT IS USED FOR ALL KINDS OF WORK ON MILLING MACHINES, SHAPERS, DRILL PRESSES AND HORIZONTAL BORING MILLS.

**IN STOCK**  
Special Thread Taps  
& Dies. Left Hand  
Taps & Dies. Plug &  
Ring Thread Gages.  
Drills, Reamers, Mill-  
ing Cutters, End Mills,  
Etc.

**WE CAN ALSO FURNISH  
DIVIDING ATTACHMENTS.**

Send for Literature and Details  
**IMMEDIATE DELIVERY**

**Send For  
200 Page  
Catalog**

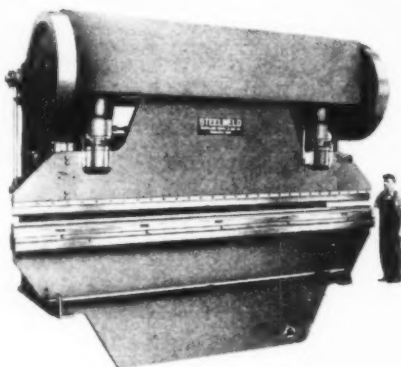
**LAFAYETTE TOOL & SUPPLY CO.**  
**128 LAFAYETTE STREET** **NEW YORK 13, N. Y.**

## NEW 500 TON PRESS HAS UNUSUALLY LONG BED

This press, made by the Cleveland Crane and Engineering Co., Model Mo6-14, has a 20 foot bed and ram which permits bending steel plate up to 20 feet x  $\frac{3}{8}$  inch or 14 feet x  $\frac{1}{2}$  inch. Twenty-one-inch bed extensions on both ends make possible hornng operations. To minimize deflection and assure accuracy, the bed extends 42 inches below the floor.

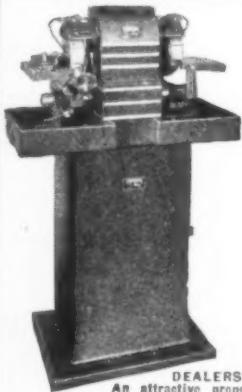
This is a two-speed machine which can be operated at either 7 or 20 strokes per minute. It is equipped with tonnage indicators on both ends that show the loading to which the machine is subjected. A clutch knock-out mechanism disengages the clutch when the press is overloaded. The back gauge being motor-driven, is quickly and easily adjusted to proper position.

The machine is operated by a mechanical foot treadle, but when desirable, air-electric control can be provided enabling the use of an electric foot switch which may be slid around the floor in front of the machine to any



position most convenient for the press operator. This type control is especially recommended for fast production.

Steelweld Presses are available for bending, forming, blanking, drawing,



**DEALERS!**  
An attractive proposition open in certain territories.

## WILLEY'S MODEL 50-A CARBIDE TOOL GRINDER

Willey's 50-A Grinder is compact and designed for the rapid, economical grinding of carbide tipped tools as well as other types of tool bits that require keenest cutting edges and extreme accuracy. It handles rough, semi-finish and finish grinding of tool bits having up to 2" square or equal cross section area. Bronze bearing trunnions support the tool rest table  $\frac{3}{4}$ " below work center, permitting grinding tools from  $\frac{3}{16}$ " to  $\frac{3}{4}$ " square without further horizontal movement — a Willey's feature that speeds production.

### WRITE FOR FOLDER

Complete specifications and illustrations of this new Willey's Grinder Model 50-A.

"Visit us at Booth 118, Cleveland, March 15-19."

## WILLEY'S CARBIDE TOOL CO.

SOLE MAKERS OF WILLEY'S METAL

1342 W. Vernor Highway

Detroit 1, Michigan



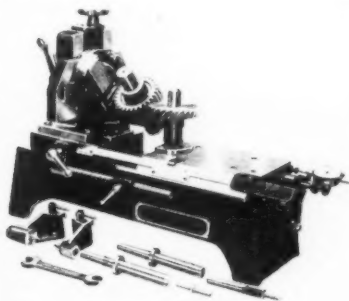
rubber-forming and multiple-punching. Extra wide bed and ram may be had to accommodate large dies and other features may be incorporated to suit special conditions. Write:

The Cleveland Crane and Engineering Co. Dept. BB.,  
Wickliffe, O.

#### PARKSON GEAR TESTER IMPROVED

The 9" Parkson Gear Tester has been completely redesigned by streamlining the base as well as other main parts and by adding changes, increasing efficient operation of the machine.

The new machine now incorporates an adjustable stop-rod, clearly indicated in the accompanying illustration. This stop rod is in addition to the precision scale and long vernier which are used for the setting of the center distance. However, when a number of gears of the same size are to be tested, it is unnecessary to repeat the scale setting. Instead, the stop-rod is set and clamped in position. To change the set-up, the left-hand slide is moved out of the way;



the gears on the arbor are replaced and the slide is then quickly and positively brought back into the same position against the stop.

The illustration shows a machine set up for spiral gears, but it is also available for spur, bevel, and worm gears, either in combination or single purpose models. Parkson Gear Testers in this country are distributed by:

George Scherr Co. Dept. BB,  
200 Lafayette St.  
N. Y. 12, N. Y.

## Plastic Floor Patch

Sets  
Instantly!



**FREE  
TRIAL  
OFFER**

There's no need to tie up plant traffic while broken concrete floors are being repaired. Durable **INSTANT-USE** will restore your floors to solid smoothness in a hurry. This new plastic resurfacer is ready for use almost as soon as it's put down. Bonds tight to old concrete, makes long-lasting heavy duty patch. Withstands extreme loads.

### TAMP! TRUCK OVER!

Simply shovel **INSTANT-USE** into the hole or rut—tamp—and your floor is ready for traffic without the usual wait for setting. Keep a drum on hand for emergencies. Immediate shipment.

Mail Coupon for

**FREE  
TRIAL  
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**INSTANT-USE**

### FLEXROCK Co.

3634 Filbert St. Philadelphia 4, Pa.  
Canadian Off.: 21 King St., E., Toronto, Ont.

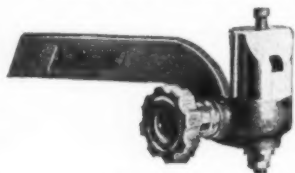
Please send me complete information  
... details of **TRIAL ORDER PLAN**—no  
obligation.

Name .....

Company .....

Address .....

## Monarch Precision SHAPLANE Radius Tools



*Patent Pending*

For Lathes, Shapers, Planers, Boring Mills, etc. Min. Rad.  $\frac{1}{2}$ " to Max. Rad.  $2\frac{1}{2}$ ". Made in 3 Models.

**C. B. TEETER**  
**Machine Specialties**  
4470 Oakenwald Ave., Chicago 15, Ill.  
Phone Drexel 3571

## ATLAS UNIVERSAL JOINTS



Joints may be fitted to specification, or with —



round bore



keyway



square hole



shoulder

Fitted to exact specification at a guaranteed saving per unit.

- Short stubby jaws for maximum strength and economy of space
- Made from heat-treated alloy steel for maximum physical properties
- Bearings located maximum distance from joint center, cutting bearing load and wear
- Sizes over  $1\frac{1}{2}$ " O.D. have grease reservoir, on Atlas exclusive
- Send blueprint for quotation, or write for catalog. Large stock on hand

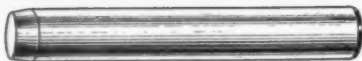


Makers of  
Atlas and Vulkan Universal Joints

GRAY & PRIOR MACHINE CO., HARTFORD 5, CONN.  
In the West: Link Belt Co., Los Angeles, San Francisco  
Portland, Seattle, Oakland, Spokane, Dallas



## DOWEL PINS



### Immediate Delivery!

Standard Size Dowel Pins from  $\frac{1}{8}$ " to 1" diameter and from  $\frac{3}{8}$ " to 6" length supplied in .0002 and .001 over basic sizes. Unless otherwise specified, .0002 oversize will be furnished.

**SCHULTZ & ANDERSON CO.**

109 Edison Place, Newark 5, N. J.

## YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

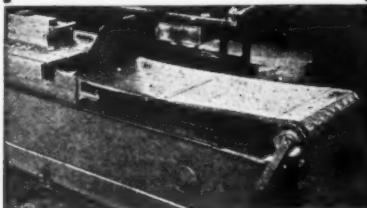
Vise No.	Width of Jaw, inches	Open inches	Weight Pounds
1D	$3\frac{1}{2}$	$3\frac{1}{2}$	$12\frac{1}{2}$
2D	5	$5\frac{1}{2}$	23

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

**YOST MFG. COMPANY**  
1335 SO. MAIN ST.  
MEADVILLE, PENNSYLVANIA

## TOSCO WAY CURTAINS FOR MACHINE TOOL BEDS



Protects ways on Planers, Mills, Grinders, Boring Mills, etc. — Keeps chips and abrasive dirt out of ways — Prolongs life of machine — saves costly repairs and overhaul time.

Rollers constructed of seamless steel tubing with special long life springs. Curtain is of rubberized material impervious to oil and cutting compounds.

3 Standard sizes

Special sizes to order

Installed easily with single brackets.

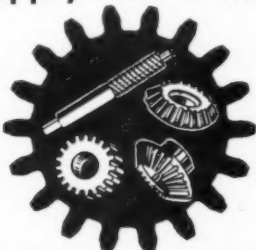
### TOOL SUPPLY CO.

40 Custer

Detroit 2, Mich.

## Have you a gear problem?

Let *Abart*  
supply the answer



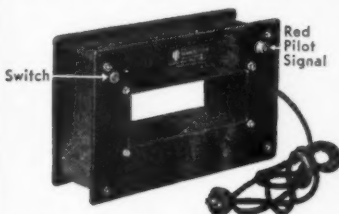
Long specialized gear experience, and every facility for most modern precision cutting. No stocks. Every ABART job a special job. Send samples or B/P for prompt estimate, any quantity.

### ABART GEAR & MACHINE CO.

4832 W. 16th St., Chicago 50, Ill.

Also Abart Speed Reducers. Ask for catalog

## AMC *Quick* DEMAGNETIZER



A necessity where machine tools are used.

Standard units available and special sizes to order.

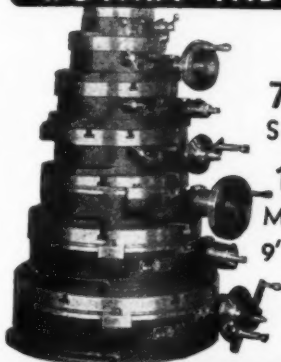
Write today for descriptive circular.

### ALOFS MFG. CO.

1629 Madison

Grand Rapids, Mich.

## SAVES TOOL MAKERS' TIME T R O Y K E ROTARY TABLES



7  
SIZES

10  
MODELS  
9" to 25"



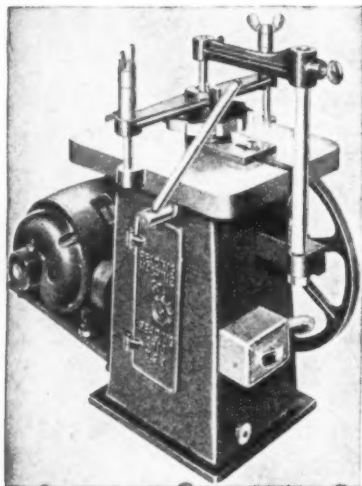
Catalog on request

### TROYKE MFG. CO.

4422 Appleton St., Cincinnati 9, Ohio

# NO BUSHINGS, GUIDES or PILOTS NEEDED

## THE READING BROACH KEYSEATER



The Reading Bench Machine requires no bushings, guides or pilots. No other machine like it. Very fast—capacity from  $\frac{1}{8}$  to  $\frac{3}{8}$  cutter. Prompt delivery—low first cost.

**READING MACHINE CO.**  
READING (CINCINNATI) OHIO

### BOX TYPE FURNACE REACHES 3000° F.

A new box type laboratory furnace with temperatures up to 3000°F. top heat, and for continuous operation as high as 2500°F. has been developed by Lindberg Engineering Co. This self-contained unit may also be used as a muffle furnace, or with carbon blocks for non-oxidizing atmospheres. The 3000°F. top heat capacity provides heat at any lower level more quickly, and the ten silicon carbide "Globar" heating elements insure uniform heating. Furnace temperatures are regulated by an indicating-controlling pyrometer with electronic circuit.

Model G-10 is designed for operation on 230 volts, 60 cycle, single phase a.c. Special voltages in a.c. will be made



to order. The variable voltage transformer, which is contained within the unit, has a capacity of 8 KW and is used in conjunction with the two tap switches, each of which have six control points for voltage regulation.

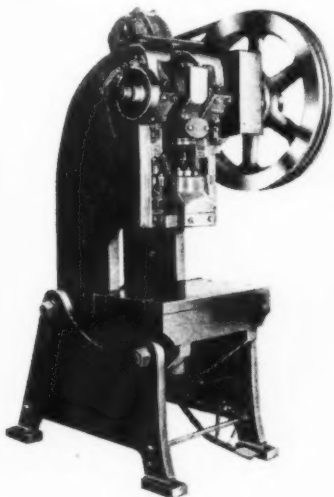
Request Bulletin No. 980 from:  
**Lindberg Engineering Co.,**  
2444 W. Hubbard St.  
Dept. BB. Chicago, Ill.

### PUNCH PRESS FOR TOOL ROOM OR PRODUCTION USE

A new 38-ton capacity, open back, inclinable punch press has been announced by the Walsh Press and Die Co., Division of American Gage and

Machine Co. Equipped with a variable speed drive, this Model 38X serves as a tool-room and test-run press or as a production press.

In the tool room the press can be used for shearing-in of dies and punches and for die try outs. Used for die try outs in place of a screw press, the Walsh 38X will give an exact indication of results on the production run. The slow motion of the screw press can result in a perfect sample when actually the metal will crack on a punch press, using the same die, because of the high speed at which the metal has to be formed. The 38X shows up this material failure right from the start.



Model 38X has a distance between gibs of 17", a bed area 18" by 26", and a throat depth of 12", and can be furnished with up to a 6" stroke in either a flywheel type or a back geared type and with either a variable speed drive or conventional motor drive. For complete information write:

Walsh Press and Die Co., Div. of  
American Gage and Machine Co.,  
Dept. BB, 4709 W. Kinzie St.,  
Chicago 44, Ill.



## LONG TAPER STAMPS



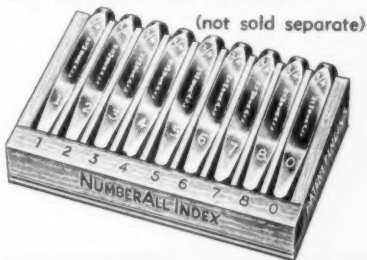
New Long Taper and Chamfered Corners for Locating Base of Letters and Aiding in Correct Spacing and Aligning • Steel Letters and Figures • Heavy Bevel • Heavy Stock • Tough Tool Steel • Deep Engraving •

Write for  
Bulletin BB 15

## PIK QUIK STAMP INDEX STAND

(Patent Pending)

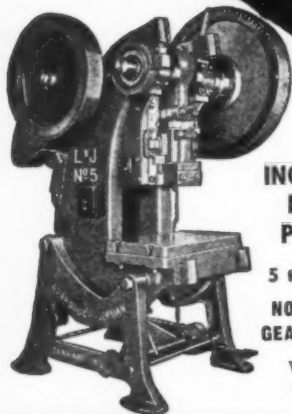
Designed to speed up your Marking. Any character is quickly picked up and replaced in the Index Stand, keeping the stamps in perfect order. Our stamp prices up to 1/4" include an Index Stand.



(not sold separate)

**NUMBERALL STAMP & TOOL CO.**  
HUGUENOT PARK STATEN ISLAND 12, N. Y.

Standard Since 1911



## INCLINABLE POWER PRESSES

5 to 79 tons  
NO. 5 BACK  
GEARED TYPE

Write for  
catalog.

### L & J PRESS CORP.

Successors to Lashbach-Jordan Tool & Machine Co.  
1821 STERLING AVE. ELKHART, INDIANA

## ★ THE ★ WONDER CUTTER



The lowest-priced wire and rod cutter on the market. The hardened cutters last indefinitely.

Hand operated. A giant for work, cuts wire and rods up to  $\frac{3}{8}$ -in. round or  $\frac{3}{8}$ -in. square and band iron up to  $\frac{1}{2}$  in. by 2-in. Adjustable stop for repeated cuts to same length. Large or small, your shop can use a WONDER CUTTER.

Write today for prices.

### THE FEDERAL FOUNDRY SUPPLY CO.

4602 East 71st St.,

Cleveland, Ohio



## The Standard of QUALITY

All standard sizes carried in stock for immediate delivery. Special cutters made to Blue Print.

As Cutter Specialists since 1919 we are able to offer the highest quality and service at attractive prices.

Write today for prices. Few Territories Open

### QUALITY TOOL WORKS

Market St., Waukegan, Illinois

## BAUMBACH THE DIE SET AUTHORITY



All Baumbach Die-Sets have demountable Leader Pins and Bushings. This exclusive feature permits removing Leader pins for machine work on the die shoe and assures reassembly without loss of alignment. A big time and trouble saver. Write for Catalog.

E. A. BAUMBACH MFG. CO.  
1810 S. KILBOURN AVE. CHICAGO 23, ILL.



## IT'S EASY To Equip Your Machines with VIMCOLIGHTS

This simple general machine light is used by many machine tool builders on their machines. Standard models for flat or side mountings. Range of extension tube lengths and interchangeable parts, described in folder 74, solve most direct lighting problems. Special lights designed upon request.



WRITE FOR  
FOLDER NO. 74

**VIMCO**  
MFG. COMPANY, Inc. 109 BRAYTON ST.  
BUFFALO 13, N. Y.

## FASTER WELDING BETTER WELDS

Higher uniform electrode pressure insures better welds and fewer throw-outs. Greater speed, automatically controlled, means more work in less time and with less effort.



The new Series A-200 is made in two capacities and five throat depths.

Write For  
Catalog No. 44

Contains latest data on manual and automatic types of spot welders—from 5 KVA to 150 KVA.

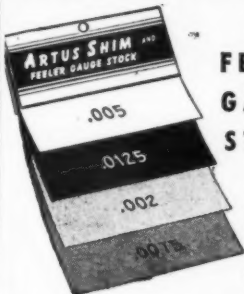
**PIER EQUIPMENT MFG. CO.**  
1650 Milton St., Benton Harbor, Michigan



**WELDERS**

## ARTUS PLASTIC SHIM

AND  
FEELER  
GAUGE  
STOCK



The COLOR  
tells the  
THICKNESS

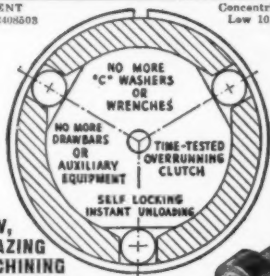
• Long lasting plastic, replaces scarce metal. Each thickness a distinctive, easy to identify color. Impervious to oil. 5"x20" sheets. Special sizes to order. Handy assortment, shim stock, 12 colors—12 thicknesses (.001-.030). Bound together—\$4.25

Order today. Immediate delivery.

A few territories open for active distributors  
**INDUSTRIAL PRODUCTS SUPPLIERS**  
434 Broadway New York 13, N. Y.

PATENT  
No. 2408505

Concentricity in  
Low 10,000ths



NEW,  
AMAZING  
MACHINING  
TECHNIQUE

YOUNG PRECISION EXPANDING  
MANDRELS FOR PRODUCTION  
OR INSPECTION



Curtiss-Wright Corporation ranks our product with their best tools. Cleveland Graphite Bronze Company, leading bearing manufacturer, states new high accuracy reached, plus substantial production boosts.

ROUGHLY SKETCH DESIRED MANDREL INTO YOUR  
PART PRINT AND FORWARD FOR QUOTES.

**YOUNG ARBOR CO. • PH. YE-9784**  
3257 Bradford Rd., Cleveland Hts. 18, Ohio

### NEW SCALING HAMMER ADDED TO ROTOR TOOL LINE

The Rotor Tool Co. announces a new  
3-1 Scaling Hammer for weld flux scal-



ing, weld spatter removal, paint scaling,  
rust removal, removing fins from cast-

ings, peening, chipping, star drilling, etc.

This S-1 is a fast, rugged and light  
tool with a graduated control in the  
throttle which gives a choice of blows  
delivered, thus covering a wide variety  
of production and maintenance work.  
Light pressure on the valve meters suf-  
ficient air for light work; heavier pres-  
sure gives ample power for heavy cuts.  
Exhaust air cleans the work of chips and  
scale and thus gives better visibility.

The chisel retainer allows easy re-  
moval of chisel by thumb pressure.  
Square broached hole in the nose elimi-  
nates nose bushing and guides the chisel  
at all times. Chisels are furnished in  
blank form, flat form, spoon form and  
a full line of star drills is available in  
sizes 3/16" to 3/4". Weight—3 pounds.  
Length without chisel—10 1/4". Bul-  
letin available from:

**Rotor Tool Co. Dept. BB.**  
17325 Euclid Ave.  
Cleveland, O.

### KELLER ONE-TON AIR HOIST

A bulletin published by Keller Tool  
Co. announces the production of a 1-ton  
capacity Air Hoist, Model 86-2V20. The

## BUILT FOR... HEAVY DUTY



The Marschke Vari-Speed grinder, the  
largest and most efficient of all heavy  
duty floor stand grinders, combines mas-  
sive ruggedness with the dependability of  
accurately controlled wheel speed.

A pair of variable speed sheaves are linked  
with the wheel guard adjustment in such  
manner that spindle speeds are auto-  
matically changed to maintain constant  
cutting speed when guards are reset to  
follow the wheel wear. This machine may  
also be equipped as a Multi-Speed Grinder,  
thus giving a choice of three speed changes.

These machines are made for wheel sizes  
ranging from 20" to 30" diameters and  
up to 4" widths, driven through multiple  
strand V belts and from 20 HP to 40 HP  
motors.

For maximum metal removal at minimum  
abrasive cost, you need this Marschke  
Grinder. Write for further information  
today.



VONNEGUT  
BRUSH BACKED  
SANDER HEADS



VONNEGUT  
ELECTRIC  
MOULDERS



MARSCHKE  
GRINDERS  
& BUFFERS

**VONNEGUT MOULDER CORPORATION**

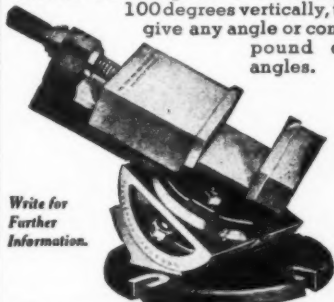
1805 MADISON AVENUE • INDIANAPOLIS 2, INDIANA



## New Britain UNIVERSAL VISE

### THE ORIGINAL

Swivels 360 degrees horizontally,  
100 degrees vertically, to  
give any angle or com-  
pound of  
angles.



Write for  
Further  
Information.

**NEW BRITAIN TOOL & MFG. CO.**  
NEW BRITAIN, CONN., U. S. A.

## MARVECO LIVE CENTERS

- HIGH SPEED
- LONG LIFE
- HEAVY DUTY



MARVECO - guar-  
anteed to outper-  
form and outlast  
any other live cen-  
ter. Write  
for free cat-  
alog, "The  
Marvels of  
Marveco."

**SEND US  
YOUR CENTER PROBLEMS**

**MARVEL TOOL & MACHINE CO.**

3401 E. McNichols Road, Detroit 12, Mich.

## Micro *Supreme* LAY-OUT AND IDENTIFICATION DYE

**12 COLORS\***

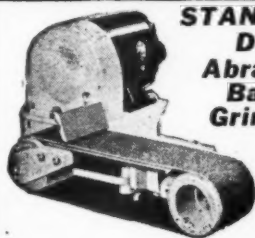
For Tool, Die, Pattern or Template layout on  
metal . . . Quick identification of stock and  
parts . . . Shows up in sharp relief—dries in-  
stantly—easily removed . . . Write for circular.

\*Purple shipped unless otherwise specified.

**MICHIGAN CHROME &  
CHEMICAL COMPANY**

6340 E. Jefferson Ave. • Detroit 7, Mich.

## STANDARD D-4 Abrasive Band Grinder



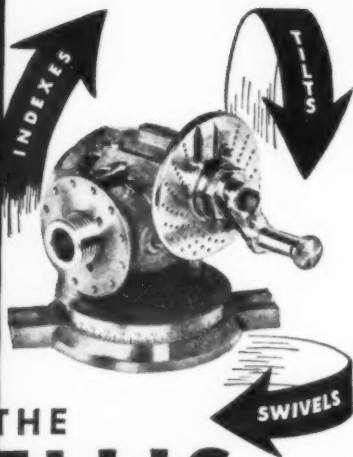
**Famous  
for  
Stamina**

This new, streamlined bench type  
grinder assures fast, quality finishing  
on metals, plastics, wood, fibre . . . at  
low cost. Built to machine tool specifica-  
tions, Standard D-4 is equipped with  
improved band tension control and  
specially designed protective motor hood.  
4x36 1/4" band. The ideal portable unit.

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## THE ELLIS DIVIDING HEAD

Many unique features make the ELLIS Dividing Head more than an ordinary indexing fixture. It is a precise, rugged unit with  $6\frac{1}{2}$ " normal swing increased to 11" swing through the use of riser blocks. It TILTS more than 100 degrees in the vertical plane—SWIVELS 360 degrees in the horizontal plane—INDEXES by crank, or directly by hand. Work is held between centers, or in chucks or collets. The ELLIS Dividing Head is a universal work head that will increase the production versatility of your milling machines, grinders, drill presses and jig borers—write for complete details today.

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CORPORATION**

42-A CHURCH STREET,  
NEW YORK 7, N.Y.

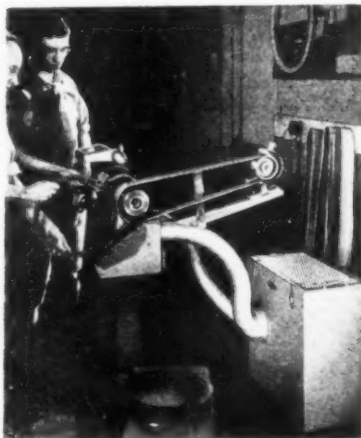
new unit is compact and sturdy; it embodies construction features of the firm's 500 and 1000-pound hoists, including variable speed which give the operator full control of positioning, raising and lowering the load at any desired speed from creep to 17 feet per minute. The standard length of lift is 8 feet.

Built-in safety features include safety stops, alloy steel roller chains, drop forged swivel hooks. The power is furnished by a vertical piston type air motor. Total weight of the hoist is 75 lbs. Further information available from:

**Keller Tool Co., Dept. BB  
Grand Haven, Mich.**

### DUSTLESS BACKSTAND SANDER FROM STANDARD PEDESTAL GRINDER

A standard pedestal grinder is quickly changed over to a dustless backstand sander-grinder combination by means of



standard backstand attachment, Dustkop dust collector, a new type hood and two lengths of flexible metal hose.

The changeover from standard two wheel grinder to combined dustproofed grinder-backstand sander requires no ducts, no cutting of wall or ceiling for ducts, since the unit is entirely self-contained, having motor driven fan, cyclone separator, and second stage filter for recirculation of cleaned air back to

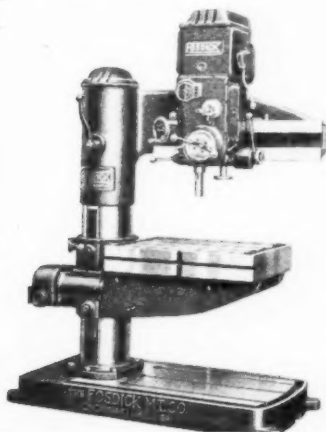
the working area to save heat. The hood need not enclose the entire belt.

Employing a standard model 420 Dust-kop dust collector, supplied by Agat-Detroit Co., two lengths of flexible metal hose and a simple hood for the sander wheel, the installation is made in a very short time with few tools. For further information write:

Agat-Detroit Co. Dept. BB  
Ann Arbor, Mich.

#### FOSDICK RADIAL DRILL HAS 360° SWING

This sensitive Radial Drill is a recent development of the Fosdick Machine Tool Co. It is equipped with a fixed arm which can be swung in a 360° arc; it is also supplied with a movable table which moves vertically around a round column, also with a 360° swing. By this design, the drill table may be placed in the proper position for any job suitable to the machine. The table may be actuated either manually or by power to

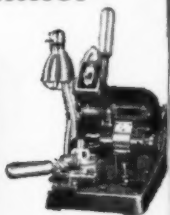


its indicated position. The drill head itself remains at the same height, placing the controls within easy reach of the operator.

The machine may be equipped with a semi-automatic tapping control, an entirely new design feature. For complete details on this new Radial Drill, write:

The FOSDICK Machine Tool Co.  
Dept. BB, Cincinnati 23, Ohio

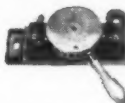
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No skill is required. An one can quickly learn to operate this unit with speed and accuracy. It is ideal for making light cuts in brass, aluminum, steel and other metals... also for rounding and burring cast iron and steel.

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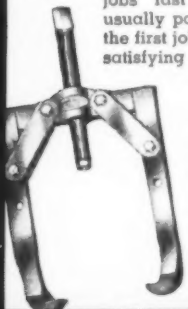
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These powerful service tools Pull gears, wheels, bearings and bushings from shafts, easily and quickly. They eliminate pounding, battering and breakage of vital machine parts. They make tedious and risky jobs fast and safe. They usually pay for themselves in the first job, and give years of satisfying service.



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Write for circular  
ARMSTRONG BRAY & CO.  
5364 Northwest Highway  
Chicago 30, Ill.



## TRICO AUTOMATIC OILER

An unbreakable Automatic Oiler to replace ordinary oil cups, designed for places where the space between oil hole and machinery is limited, is a new development of Trico Fuse Mfg. Co. The feed spout is located at the side instead of dead center, enabling the Oiler to be mounted with only  $\frac{1}{4}$ " clearance.



The Oiler lubricates solid, wick, or waste-packed bearings. The rod rides on the rotating shaft, and the slightest vibration or vertical movement releases the oil from the plastic bottle. As the bearing heats, thermal action forces oil on the bearing at a greater feed rate. The feed stops when the shaft is not in motion. The correct amount of oil is evenly distributed to the bearing. Oil waste, down-time necessitated by frequent hand oiling, oil damage, and fire hazards, are eliminated.

The oil supply is visible, since the reservoir is of unbreakable plastic. The unit is light in weight; all metal parts are cadmium-plated for easy cleaning. The Trico Oiler is made in 1, 2, and 4 oz. capacities. It is installed simply by removing the old oil cup, screwing in the  $\frac{1}{8}$ " pipe thread adapter which is furnished with each unit.

Trico Fuse Mfg. Co. Dept. BB  
2948 No. 5th St.,  
Milwaukee 12, Wis.

## AUTOMATIC FEED ATTACHMENT AIDS CENTERLESS LAPPING OPERATIONS

Feeding, holding, and ejecting are accomplished automatically with a new automatic feed attachment for centerless lapping machines. Operator, after adjusting tension on holding applicator, merely keeps feed chute loaded with pieces to be lapped. Cylindrical pieces feed in between lapping rolls; are lapped to a precision finish of less than two micro inches as they move to the left under the holding vane, and are ejected at the opposite end.

Quickly adjustable spring tension on holding applicator determines pressure that will be applied to cylindrical pieces as they are lapped. As one of the four

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holding vanes becomes gummed up with lapping compound and other material, a clean vane can be immediately rotated into working position.

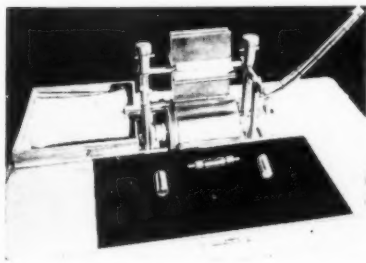


Illustration shows: cylindrical pieces in feed chute at right; 4-vaned holding applicator holding pieces between lapping rolls in center, and pieces being ejected at left. For further information;

Size Control Co., Div. of American Gage & Mach. Co.,  
2500 Washington Blvd. Dept. BB  
Chicago, Ill.

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Weight 12 ounces;  
length 6 3/4 inches;  
chuck size 1/8 inch.  
Wheel guard removed for better illustration.

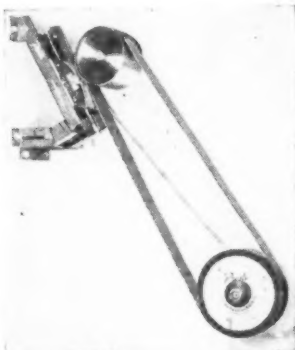
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## BACK-STAND IDLER REQUIRES LIMITED FLOOR SPACE

Conversion of standard polishing lathes to abrasive belt polishing without additional floor space is made possible by the Presto Universal Back-Stand Idler, announced recently by The Manderscheid Co. The unit operates on wall, ceiling, floor, or bench, making repositioning of the lathe to secure adequate space unnecessary. A leaf spring tension, with 12" adjustment keeps the belt tight. The belt



tracking is adjusted from the operator's position. The pulley may be easily changed from right to left hand operation. The unit is of all steel construction, with sealed ball bearings.

Literature will be mailed upon request to:

**The Manderscheid Company**  
Dept. 107, 810 Fulton St.,  
Chicago 7, Ill.

## MICROMETER ADJUSTABLE BORING BAR

Melin Tool Co. announces the New Precise Boring Bar, precision built and claimed to give greater ease of adjustment and a new high in precision accuracy. This accessory is claimed to save from one-half to two-thirds in time on milling machines, turret lathes, jig bores, and horizontal boring mills.

The Bar is adjusted on the same principle as a micrometer and is adapted for boring long and hard to reach holes, or boring inside a casting which is larger in diameter than the outside hole, and

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**\$52.50**  
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#### *Dahlstrom* **TAP GUIDE**



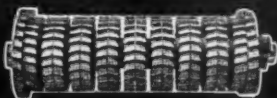
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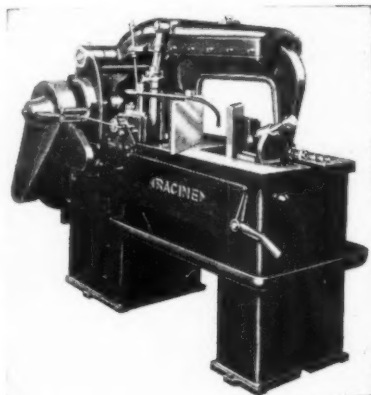
for bottoming. The tool can easily be removed without changing the adjustment

and blade for measuring the cut-off lengths of stock. For complete details, write:



on the machine. The tool bit is removable either for sharpening or replacement. It is available in three sizes. Other data is available upon request to:

**Melin Tool Co., Dept. BB**  
3370 W. 140th St.  
Cleveland, Ohio



#### **RACINE HYDRAULIC METAL CUTTING SAW**

A new "Oil Cut" model, fully hydraulic metal saw, capable of cutting all types of metal in sizes up to 10" x 10" is announced by Racine Tool & Machine Co. The feed and pressure controls, rapid traverse, and the lift on the non-cutting stroke are all hydraulically operated. A single lever located at the front of the machine regulates the rapid traverse and clutch. A push-pull lever allows a gradual lowering of the frame

**Racine Tool & Machine Co., Dept. BB**  
1740 State St.  
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## **STANDARDIZING ON *Nicholson* Valves PAYS OFF**

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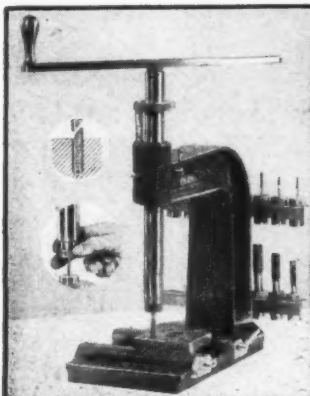
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Littell Reels are made in 100-lb. to 20,000-lb. capacities. Automatic spindle and cradle types. Plain and motor-driven. Used in thousands of plants for faster production.

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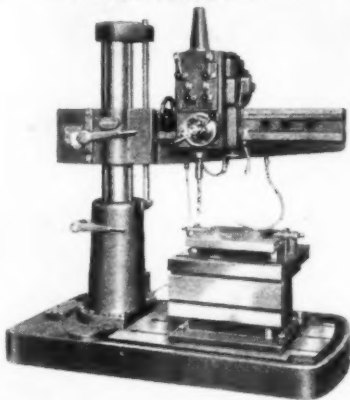
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## SMALL SIZE DRILL PRESS HAS 9 SPINDLE SPEEDS

A new "bantam" size radial drill press, with a maximum operating capacity of 1" in cast iron, is a recent development of the Canedy-Otto Mfg. Co. The machine is the outgrowth of a study made by the manufacturer, in which it was revealed that 99.3% of all radial drilling done is within the 1" range.

The new unit is available with a 3' arm and 7' column, has 9 spindle speeds, is equipped with a single speed motor, and six rates of power feed. Two motors



are used; one main driving motor for the head mechanism, and one fractional h.p. motor for the power mechanism of the arm.

The press has a semi-cast steel base, with integrally cast tank for adaption of

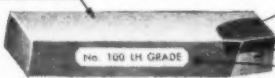
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a coolant system. The column is of tubular steel, with ends welded into position, turned and ground to accurate tolerance. The head and arm are of semi-cast steel, heat treated and normalized, machined to close tolerances. All gears are of hardened alloy steel, shaved or ground.

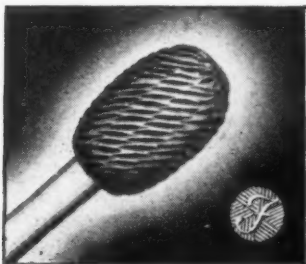
The feed transmission is an independent unit held in position and in proper gear mesh with the pick-off power transmission gears. The main drive clutch is a multiple disc friction dual type, offering forward and reverse rotation for convenience in tapping. The spindle is of alloy steel hardened and ground and provided with multiple spline. For complete specifications and information, write:

**The Canedy-Otto Mfg. Co., Dept. BB**  
Chicago Heights, Ill.

#### **ZINC AND ALUMINUM DIE CASTING MACHINE**

The Two-Pounder, a new model die casting machine for zinc and aluminum, is announced by DCMT Sales Corp. Aluminum can be cast as rapidly as zinc with this machine. The production rate for each metal is about 350 shots per hour. Features of the Two-Pounder include the fact that the change-over from zinc to aluminum die casting can be made without the use of the hand ladle for each shot in aluminum. The capacity is 2 pounds on zinc and 1 pound on aluminum, on 12" x 18" standard die blocks. There are no tie bars through the die blocks, which leaves all four sides open for core pulls or placement of inserts. The die carrier slides on dovetail ways. The machine is pneumatically operated, and controlled entirely from one toggle switch. For information, write to:

**DCMT Sales Corp., Dept. BB**  
Foot of Beach, 79th St.  
Rockaway Beach, N. Y.



### **FORD ROTARY FILES**

#### **The Right File for the Right Job**

For over 25 years Ford rotary files have been known for their high quality and precision workmanship. They are available from your mill supply house.

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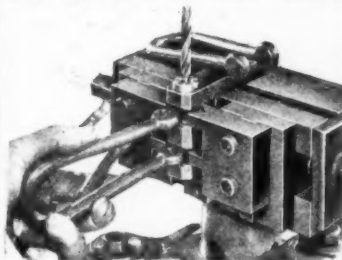
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Publisher requires accuracy first.

## ROLL GRINDING LATHE KEEPS PRESSES ROLLING

Keeping a battery of high speed presses running day after day requires efficient rubber roll maintenance. At Crowell-Collier Publishing Co., Springfield, Ohio, this important work is done by a highly developed main press roll department.

Included among the special purpose machine tools in this department is a brand new 25" LeBlond heavy duty roll grinding lathe which will accommodate rolls up to 13" in diameter, 120" in length.

This lathe is equipped with heavy duty 5-hp grinding unit designed by LeBlond, a special revolving spindle tailstock, and two steel-body chucks.

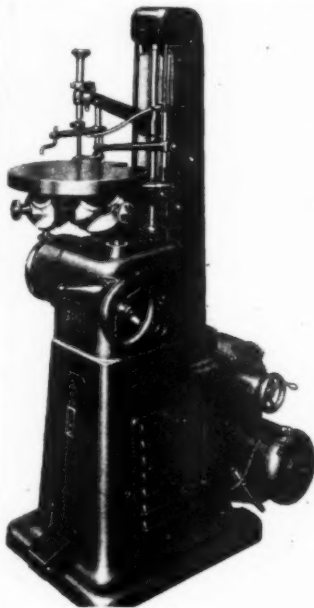
Although the publisher insists on quality first and speed second, it is believed the new 25" LeBlond lathe will provide both essentials in good measure.

Designed primarily as a rubber roll grinding machine, the 25" LeBlond is readily adaptable to standard metal working operations.

A Regal roll polishing machine, a light pattern lathe for smaller rolls, is also manufactured by LeBlond, and is equipped with a 2-hp grinder. For complete information, write Roll Grinding Dept., The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio.

## WILLIAMS DIE MAKING MACHINE

The Williams Die Making Machine, made by the Connecticut Tool and Engineering Co., compensates for the run out of files by the side movement of the upper movable arm. The lower stationary arm and upper movable arm which support the files and saws are mounted on a shaft rigidly held by bushings above and below the work table. This construction insures precise guidance of files and saws, in operations involving intricate work, and not only guarantees greater accuracy, but is claimed to prevent bell mouthing in filing, and allows rapid and accurate sawing.



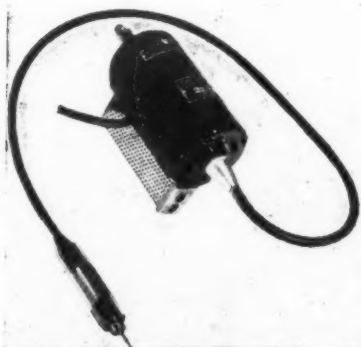
The holding frame formed by the two arms and part of the shaft may be shortened or lengthened to fit the work piece, since the upper arm can be set as desired. This is an important feature for a machine which is to be used for a large range of work, involving saws of a size from jewelers saws up to  $\frac{3}{8}$ " in width, and files in thickness from  $\frac{1}{64}$ " up to  $\frac{1}{2}$ ".

The accuracy of the Williams machine is dependent upon the exact vertical reciprocation of the guide bars which carry the file holder. The unit has a stroke range of from 0 to 5". The table is 17" in dia., with a 5" adjustment, and a 10° tilt in any direction. Overall dimensions of the machine are 30" x 42" x 64". For further information, write:

Connecticut Tool & Eng. Co.  
544 Iranistan Ave., Dept. BB  
Bridgeport 4, Conn.

#### FLEXIBLE SHAFT MACHINE MAINTAINS UNIFORM CUTTING SPEED

The Electro-Mechano Co. announces the new Speed-Right Flexible Shaft Machine, designed to meet the demand for a hand tool that will drive midget mills, rotary files, burrs, drills and other carbon and high speed steel cutting tools at the correct cutting speed, and maintain the proper r.p.m. under both load and no load conditions. The unit will not slow down when put to work because a positive speed control gives reduced speeds while maintaining the maximum motor torque. Any required r.p.m. can be set at the finger-tip speed control lever. Speed range is from 1000 to 10,000 r.p.m.



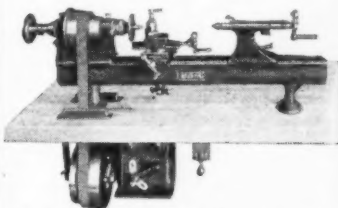
Once set, the cutting speed remains constant without further adjustment regardless of whether the tool is cutting or idling, which results in uniform cutting. Grit grinding wheels also operate better at the uniform speeds provided by the Speed-Right Flexible Shaft Machines.

Longer tool life results, since proper

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**Integral Drive Precision Bench Lathes.** Double-taper headstock bearings of highest accuracy, or best precision pre-loaded ball bearings. Two good sizes  $\frac{3}{4}$ " and 1". 30 Precision attachments available.



**Open Cone Lathes** world-known. Four sizes, with compact under-bench Motor Drive Unit.

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**Stark Tool Company**

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ESTABLISHED · 1862

*Originators of the American Bench Lathe*

cutting speeds practically eliminate burning, chipping and breakage. The Speed-Right Flexible Shaft Machine is powered by a 1/10 h.p. ball bearing motor. Speed control is provided by a centrifugal force electrical governor mounted in the motor case. A hanger bracket is provided for easy mounting.

Two rotary handpieces are available: a ball bearing handpiece equipped with a No. 0 Jacobs chuck, and a sleeve bearing, small diameter handpiece. For additional data, write:

**The Electro-Mechano Co. Dept. BB**  
261 E. Erie St.  
Milwaukee 2, Wis.

#### 9,000 RPM DRILLING UNIT

High speed drilling units, Model "J-6" with 6,000 r.p.m. and the Model "J-9" with 9,000 r.p.m. spindle speeds have been announced by The Govro-Nelson Co.

Both Models are equipped with 3 phase, 60 cycle induction motors geared to spindle speed specified for each model. With an adjustable stroke up to  $\frac{3}{4}$ " and maximum collet capacity of  $\frac{1}{4}$ ", the units are suitable for drilling, ream-

ing, countersinking, spotfacing and hollow milling.

The design features ball bearing suspension and free rolling centrifugal weights. The feeding mechanism operates in an oil bath with the unit sealed to retain the oil and prevent entry of coolant. A built-in rate of feed control provides the slow feed required for reaming or faster feeds



for other operations. The spindle dwells automatically at the forward end of the stroke to clean up on a countersinking or spotfacing operation.

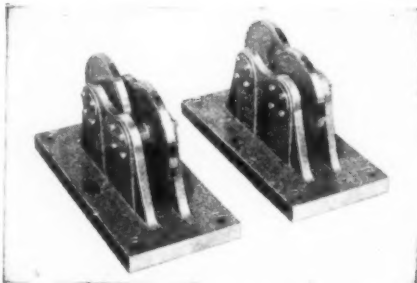
May be operated at any angle in single or multiple set-ups, simultaneously or in sequence with remote electrical controls. For further information write:

**The Govro Nelson Co.,**  
1931 Antoinette St., Dept. BB  
Detroit, Mich.

## PILLOW BLOCK BALANCING WAYS

Especially suited for large diameter work, as a sub-base can be made of proper height to give necessary clearance for work.

Anderson Pillow Block Balancing Ways are precision built with chilled iron discs which rotate with minimum friction on sensitive special bearings. Many manufacturers have endorsed them for profitable, efficient, static balancing.



**Built in 1000, 2000, 5000, 10,000  
and 20,000 Capacities**



Write for Bulletin 2-5

**ANDERSON BROS MFG. CO., Rockford, Ill.**

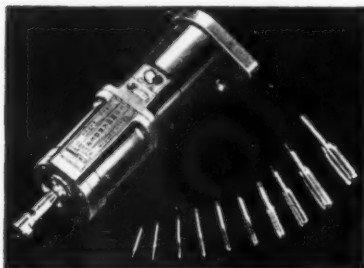
Balancing Ways, Roto Checkers, Hand and Power Scrapers, Spotters, Hand and Power Hydraulic Straightening Presses.



**TAPPER HANDLES SIZES FROM  
No. 0 TO 3/4"**

A new tapping head handles taps from No. 0 to 3/4" and is designed to fit any drill press. The Commander Tapper, made by the Commander Mfg. Co., employs a patented spring clutch drive and an adjustable torque control. The tapper takes a wide range of taps with equal efficiency and sensitivity. It is claimed the tapper will replace three conventional tappers. The tapper is suitable for cycle tapping and O. D. threading, as well as routine machine tapping. Accurate blind hole tapping is accomplished without damage to taps due to the multi-torque control.

The adjustable torque control, preset for the tap size, permits the tap to move



into and out of the work with automatic sensitivity. Torque can be set when the tapper is on or off the drill press by merely pushing a button and turning scale to desired position. Complete information can be had from:

**The Commander Mfg. Co. Dept. BB**  
4225 W. Kinzie St.  
Chicago, Ill.

**MOTOR MICA**

TRADE MARK REG. U. S. PAT. OFF.

**ANTI-FRICTION COMPOUND**  
**SERVING INDUSTRY FOR 34 YEARS**

Cools hot bearings • Solves toughest lubricating problems • Saves wear on moving parts • Works wonders with cutting oils • Packed in 5-10-25-50-100 lb. containers. **Write for Free Sample.**

**SCIENTIFIC LUBRICANTS CO.**  
3469 N. Clark St. Chicago 13, Ill.

**DON'T WAIT UNTIL TAPS  
BREAK OFF — and then  
wish you had a set of  
WALTON  
Tap Extractors**

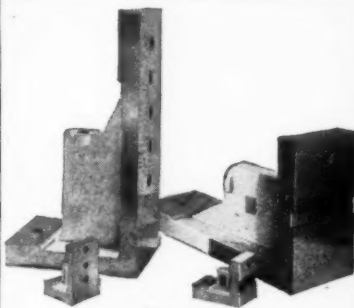
**Remove  
Broken Taps  
Quickly and  
Easily.**

**Write for folder  
No. 12 and full  
details of 30 DAY  
FREE TRIAL  
OFFER**



**Have them on  
hand for this  
emergency.**

**The WALTON Company**  
Hartford 10, Connecticut



Patented

**World's Best; Surface, Lapping, Angle  
Plates, Straight Edges, Box and Steel  
Parallels, semi-steel plates and special  
products. Until further notice write**

**TATRA TOOL CO.**

Box B-62

**e/o HITCHCOCK PUBLISHING COMPANY**  
342 S. Dearborn St. Chicago 5, Ill.



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Low carbon or 40-50 carbon hot rolled plate, sheared or flame cut and ground to a high finish—END, STRIPPER, BOLSTER or BED PLATES, GUIDE-RAILS, CAMS or "What-have-you". Sizes up to 25"x120" or 20"x144".

SEND SPECIFICATIONS & QUANTITIES FOR QUOTATIONS.  
Production Surface Grinding on Hugh Mattison Grinders  
Makers of Hi-carbon velvet finish GROUND FLAT STOCK!

Write:  
Box 588

**MARSHALL STEEL CO.**  
LISLE, ILLINOIS

## KELLER AIR-OPERATED IMPACT WRENCH

Production of a new Impact Wrench, Model No. 18-6, is announced by Keller

to set nuts that ordinarily require nut setters many times the size and weight. The same simple, direct impacting mechanism is used as in smaller Keller Impact Wrenches. There are no springs, gears, or clutches.

An air motor of the rotary type furnishes the speed and power for fast nut running. By means of a simple, built-in torque regulator, the power may be adjusted to torque requirements of the individual job. The tool can be operated in reverse by turning a reversing valve, to serve in disassembly and dismantling operations. The length of the wrench is 8 3/8" overall; the net weight, 9 lbs. For further data, write:

Keller Tool Co., Dept. BB  
Grand Haven, Mich.

## TOOL HOLDING DEVICE DESIGNED FOR AMPUTEES

A kit of holding devices, designed especially for handicapped persons, is being offered by Lapeer Mfg. Co. By means of these devices, the amputee can lock almost any kind of a tool within its grip and perform tasks with practical efficiency. The locking and releasing of



Tool Co. This tool has a nominal capacity of 5/8" bolts, with sufficient power



## This PALMGREN

No. 000 ANGLE VISE for MILLING-DRILLING-GRINDING Etc.

Solve Difficult Angle Jobs. Get QUICK, ACCURATE, SET-UPS and save time, money, rejects. Accurately machined and graduated to full 90°. Also use horizontal. Steel Jaws 2 1/4" plain or grooved. Immediate Delivery - Write For Circular 331 CHICAGO TOOL & ENGINEERING CO. 8384 South Chicago Ave. Chicago 17, Ill.

## Combination Can't Be Beat!

No. 250 MILLING ATTACHMENT Converter Lathes in 18 Seconds! Mill, Slot, Grind, Groove, Square Shafts, Saw at Angles, Recess Etc. on LATHE. Precision built—90° graduation for rotary angle and graduated vertical feed screw.

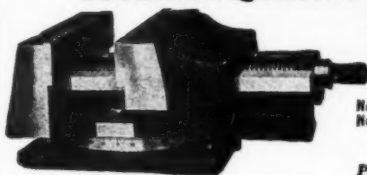


Fits all lathes—straddles tool post.

Photo Engineer 9473



## SUPERIOR QUALITY AND WORKMANSHIP IN PLUNKET VISES



**SQUARE BASE SHAPER VISE**

The Shaper Vise has graduated swivel base and tongue in center to fit slot in table, and has holes for bolting down. In ordering this vise give size of slots in Shaper Table, also distance from center to center of slots.

No. 40, 18" jaws, 2 1/2" deep, opens 8 1/2". Weight 125 lbs. \$75.00

No. 4, 6" jaws, 1 1/2" deep, opens 5". Weight 45 lbs. \$55.00

Our complete line includes Vises for Drill Presses, Milling Machines, Shapers and Grinders.

Prices are net, f. o. b. Chicago. Write for illustrated folder today. Dealers inquiries solicited.

**J. E. Plunket Machine Co.** 1333 W. Lake St.  
Chicago 12, Ill.

the working tool can be done with the flick of a lever. The gripping pressure is adjustable.

Three devices comprise the kit—a Vise Wrench, 7" long, that can be made



to hold any shape, and be used for hundreds of purposes; Knu-Vise Pliers, with screwdriver slot on spindle to facilitate adjustment of pressure to accommodate varying thicknesses held; Flexi-Grip Pliers which require no presetting. The

spindle automatically adjusts itself to varying thicknesses of materials held up to 3/8".

The kit is supplied with an adaptor that can be screwed to any standard artificial arm, and with a wingscrew can be made to hold the desired tool in use. These devices should do much to help the veteran amputees to rehabilitate themselves. For additional information, write:

Lapeer Mfg. Co., Dept. BB  
2906 W. Grand Blvd  
Detroit 2, Mich

### MILL IT ON YOUR LATHE

This Milling and Keyway Cutting Attachment is ideal for shops not having a milling machine. It can be used for milling, boring, keyway cutting and other operations. Mounts on compound rest base of South Bend Lathes.

Lathe Size	Vise Cap.	Price	Lathe Size	Vise Cap.	Price
9"	1-1/2"	\$35	14-1/2"	4"	\$65
10"	1-3/4"	\$45	16"	4"	\$75
13"	2-7/8"	\$55	16/24"	4"	\$75

Write for dimension sheet

**SOUTH BEND LATHE WORKS**

426 E. Madison St.  
South Bend 22, Ind.



**STANDARDIZED  
LEAF DRILL JIGS**  
**SAVE YOU TIME & \$\$\$**

**SEND FOR CATALOG B**

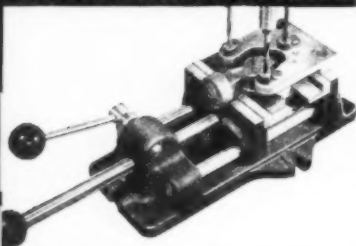
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**3515 NO. TENTH ST.**

**AGENTS WANTED PHILADELPHIA 40, PENNA.**

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**CUT COSTS  
UP TO 75%  
ON JIGS AND FIXTURES**



You can stop the heavy expense and time losses common in the building of special jigs for drilling and light milling operations. Use the Heinrich "Grip-Master" as a base-structure. Built-in bosses and removable parallels permit easy attachment of bushing plates and locating jaws. You can speed up loading and unloading unbelievably, thanks to the large jaw openings of the "Grip-Master" and its revolutionary *screwless* feature.

**WRITE FOR FULL FACTS!**

Ask your Mill Supply Dealer about the Heinrich "Grip-Master." If he does not yet have a stock, write for folder that fully illustrates and describes the money saving uses of this amazing tool.



HEINRICH  
**Grip-Master**  
DRILL PRESS TYPE  
**SCREWLESS VISE**

**NATIONAL MACHINE TOOL CO.**  
DEPT. 108-B, RACINE, WISCONSIN

**NEW INSPECTION DEVICE**

Simplicity in design and faster speed in precision inspection are the chief characteristics of the new Cleveland Republic Indexmaster.

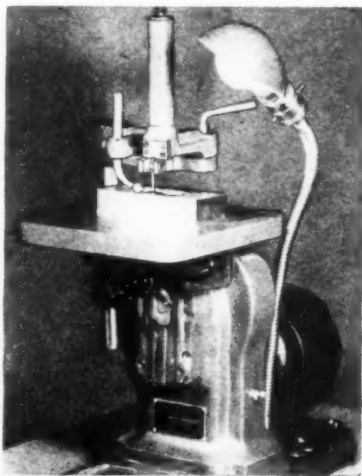
This equipment entirely eliminates the sine bar method of inspection by providing standard "jo" block measurement for all layout, checking and inspection operations. The Indexmaster is built for both extreme accuracy and for quick, mass-production operations.

Two models of the Indexmaster are in production, both with the same basic features but with different uses—the Universal model having bench centers for smaller, more flexible applications while the Master model takes up to 10" diameter work capacity. For further information, write:

**The Cleveland Republic Tool Corp.**  
1265 Union Commerce Bldg.  
Cleveland 14, Ohio.

**NEW DIE MAKING MACHINE HAS  
RETRACTABLE FILE HOLDER**

A new small-sized die filing machine, Model T-1, has been developed by the Ideal Tool and Die Co. for filing, sawing,



and honing of dies, cams, templates, keyways, special cutters and tools, etc. Important features include a 4-way or compound tilting die table, 8 3/4" square,

with angle graduations by degrees. The dovetail slide is hardened, ground, and lapped. The all ball bearing, 2-speed V-belt drive allows 350 or 525 strokes per minute. The adjustable stroke is from 0 to 1". A retractable file holder for quickly retracting the file below the die when inspecting or removing the die from the table is provided.

The unit is equipped with a reciprocating sawing and filing guide which is interchangeable for a rolling back support. The Model T-1 is furnished with a light switch cord and motor. The overall weight is approximately 100 pounds. Further information will be sent upon request to:

Ideal Tool & Die Co., Dept. BB  
733-35 Congress St.  
Schenectady 3, N. Y.

#### SWIVEL CONVEYOR HOOK HAS SPROCKET WHEEL

Conner Tool & Die Company, Grand Rapids, Michigan has designed this new type swivel conveyor hook. The hook is fabricated entirely of stampings, and will fit any overhead monorail system.



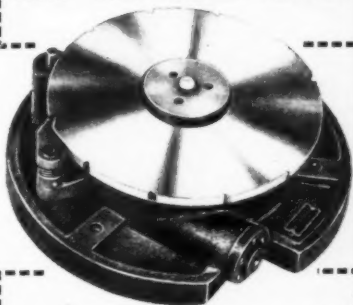
Made with sprocket wheel for continuous rotation as in a spray booth. Can be built with automatic indexing wheel. Two styles available—indexing type or plain swivel. Immediate delivery. Complete information from:

Conner Tool & Die Co., Dept. BB.  
Grand Rapids, Mich.

## THE NEW AIR-OPERATED ALLEN DIAL FEED TABLE

For use with PUNCH PRESS, DRILL PRESS, PRODUCTION MILLER, SPOT WELDER, etc.

SOLVE THAT SPECIAL PROBLEM



**MODEL A—** Dial Feed Table timed by the machine to which it is to be synchronized.

Available in 2 sizes

No. 7 $\frac{1}{4}$ -A — 7 $\frac{1}{4}$ " Index Plate, 9" base, 2 15/16 overall height.  
No. 11-A — 11" Index Plate, 14" base, 4" overall height.

**\$125.00**

**\$175.00**

Special Index Plates available with from 8 to 40 notches. 12-position is standard.

**MODEL B—** will automatically index with speed adjustable from 1 indexing each half second to 1 each ten seconds.

Available in 2 sizes

No. 7 $\frac{1}{4}$ -B — (specifications same as 7 $\frac{1}{4}$ -A).

**\$155.00**

No. 11-B — (specifications same as 11-A).

**\$205.00**

**ACCESSORIES —** specially designed for use with Allen Dial Feed Tables

- \* Air-operated down clamps and side clamps with 4X power factor are available for holding the work piece.
- \* Knockout for ejection of the work piece from the index plate.
- \* Special 2 and 3-way valves to synchronize the clamps and knockout with the table motion and thereby tremendously increasing the versatility of operation.

Prices F.O.B., Brooklyn, N. Y.  
Write for illustrated brochure.

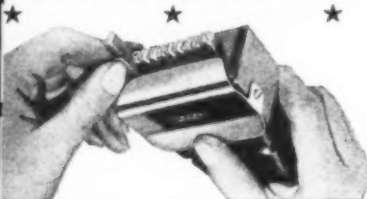
**The A. K. ALLEN CO.**

Exclusive manufacturers of Dial Feed Tables  
3011 Ft. Hamilton Parkway  
Brooklyn 18, N. Y.

# HERCULES

REG. TRADE MARK

## HOLDERS



**HERCULES HEAVY DUTY HAND HOLDER,** showing the quick and easy manner in which type is changed. Made in all sizes, and furnished for hand or press use, these Holders permit any practical capacity. Large sizes have a fuller or eye for handle.

**FASTEST POSSIBLE INTER-CHANGING OF TYPE** ★  
**FOR GANG-STAMPING** ★  
**EITHER NUMBERS OR** ★  
**LETTERS** ★ **CAN STAMP** ★  
**ANY UNTEMPERED METAL** ★  
**OR MATERIAL** ★ **TYPE** ★  
**TAPERED TO FACE FOR** ★  
**EASY POSITIONING** ★  
**EXTRA BODY AND** ★  
**SHOULDER ON TYPE FOR** ★  
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**MADE OF SHOCK-RESIST-** ★  
**ING BAR STOCK STEEL.**

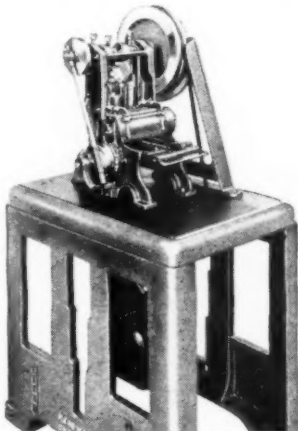
**THE ACROMARK CO.**

3 MORRELL ST. ELIZABETH 4, NEW JERSEY

### ACE FLEXOPRESS ACCELERATES SMALL PARTS PRODUCTION

The high-speed automatic Flexopress is a recent development of the Ace Tool & Die Works. This new press is claimed to speed up small parts production and reduce manpower as a result of its high capacity. The unit has an infinitely variable speed range of from 150 to 600 r.p.m. It is capable of cutting production materials in uniform lengths up to 9", stamping and forming light parts, such as clips, connectors, lugs, etc., perforating light metal. Production rates of from 9000 to 36,000 pieces per hour are accomplished, depending upon the material and type of work.

Since the Flexopress is completely automatic, one inexperienced operator can tend a battery of six or more units.



All parts of the press are precision machined. The feed is roll type; material is fed by measured revolutions of two 3" dia. steel rolls, 5 3/4" wide, held tightly against each other by spring tension. The feed has an automatic release operated by the ram, enabling the material to be fed to a fixed stop or to allow a pilot pin to shift the material to a precise position before an operation requiring extreme accuracy is performed by the dies.

Specifications include an overall height of 52 1/4", a stand or table dimension of

20" x 30" x 30". The ram stroke is 1 1/4", with an adjustment of 1 1/2". The throat depth is 3 3/4". The motor is 1/3 h.p., 110 volt, 60 cycle. For complete information, write for folder No. 7-47 to:

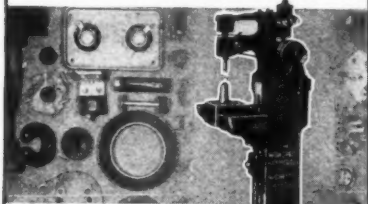
**Ace Tool & Die Works, Dept. BB**  
129 E. McMicken Ave.  
Cincinnati 10, Ohio.

#### STEEL ADJUSTABLE COMPARTMENT SHELF DRAWERS

Bay adjustable compartment shelf drawers are ideal for handling and storing small quantities of small parts. Boxes are slotted on 1" centers to accommodate dividers. Back stop prevents drawers from accidentally dropping. Drawers may easily be removed from rack by pulling outward and upward. Label holder on front of box for easy identification of contents. Handle on front only. Drawers are finished in baked green enamel. Drawers are packed 10 in a carton. Rack is shipped assembled. Dividers are available at slight extra cost.

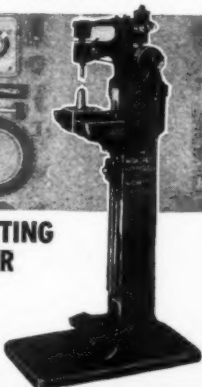
**Bay, Inc. Dept. BB.**  
3003 N. 16th St.,  
Philadelphia, Penna.

#### INCREASE YOUR PROFITS WITH A HIGH SPEED



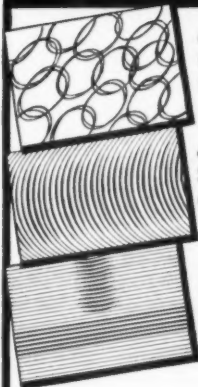
#### COLD RIVETING HAMMER

GET A FREE  
ANALYSIS OF  
YOUR RIVETING  
PROBLEM ...  
WRITE TODAY!



**The High Speed Hammer Co., Inc.**  
311 Norton St. Rochester 5, N. Y.

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**NO**  
CHAIN-ETCHINGS  
WITH EASY

**NO**  
SWIRLS OR CROSS-  
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**NO**  
LAPS OR GOUGES  
WITH EASY



**STRAIGHT-LINE**,  
back and forth  
action with  
"hand sanding"  
results — on  
CURVED or flat,  
WET or dry work.

**EASY** cuts, no abrasive marks, swirls  
etc. Gives **HAND FINISH** (top qual-  
ity) results in 1/3 the time. For sand-  
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edging"; on metal, wood, slate, plasti-  
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*1000's are Saving with it*  
*..... Write for Facts*  
**Easy** RECIPROCATING  
ELECTRIC SANDER

## SCHERR aids to precision — production

### SCHERR HAND TACHOMETER



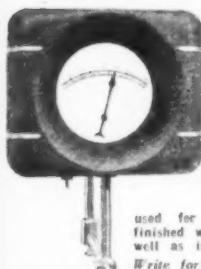
Measures rpm without timing or calculation while held against end of rotating shaft. Any variation in speed caused by belt slipping, overload, etc., is instantly noted. Also have disc for measuring surface speeds in feet per min. Made for speeds from 30 to 12000 changing speed range by new rotating shift mechanism. Other types to 48,000 rpm. Write for details.

### SCHERR SPEED INDICATOR



Gives direct readings in rpm in a test requiring only 6 seconds. Needle remains at reading until released by pressure of button. Also measures linear speeds using disc attachment. Two types, ranges to 20,000 rpm. Full data on this and other Scherr speed measuring instruments on request.

### SCHERR MAGNI-RAY For Reading PRECISION INSTRUMENTS



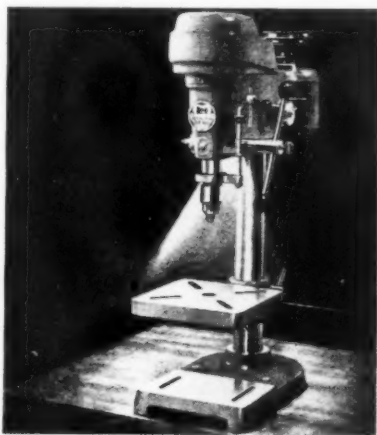
Saves steps, time, eye-strain, and assures accuracy in reading of indicating instruments, tool settings, etc., at a distance or near-by. Illuminates and magnifies. Large 5-in. lens of optical glass is adjustable to any angle, with heavy base, or can be clamped where required. Plugs into any 110-v. circuit. Other types, widely used for inspection of precision finished work and small parts, as well as in production use. Write for full Magni-Ray details.

### SOUTH BEND PRECISION DRILL PRESS

A new 14" Precision Drill Press, in both bench and floor models, is announced by the South Bend Lathe Works. Most specifications are common to both models, each having a capacity to drill  $\frac{1}{2}$ " in iron or steel at the center of a 14" circle. A built-in light, with independent switch provides shielded illumination for the work area. A quick-acting belt tension release lever simplifies changing the spindle speeds and returns the vertical mounted motor to its original position after each change, thus maintaining the same belt tension for each of the four cone pulley steps.

The spindle has a 4" travel, with speeds of 707, 1305, 2345, and 4322 r.p.m. The depth gauge is graduated in sixteenths of an inch, and has adjustable collars to control both the depth of feed and the length of the return stroke. Two precision ball bearings carry the drive unit load, and two additional ball bearings carry the spline-driven spindle. All ball bearings are pre-lubricated and sealed. The spindle quill bearing has adjustment to compensate for quill wear.

A full tilt type table, with 10" x 10" precision ground top surface, has slots for clamping fixtures or work. An improved type of double plug binder is



provided for locking the table in any position on the  $2\frac{3}{4}$ " column.

The Bench Model Drill Press has 10% "

**GEO. SCHERR CO., Inc.**

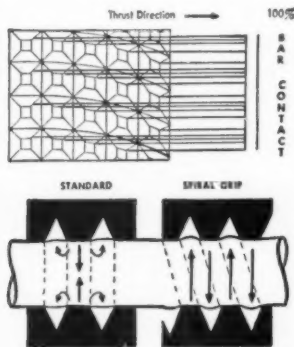
198 - Lafayette St. New York 12, N. Y.

maximum chuck to table distance, 10 $\frac{1}{2}$ " table travel, a 10-3/4" x 17-3/4" slotted base with precision ground top surface, 35 $\frac{1}{2}$ " over-all height, 195 lbs. domestic shipping weight. The Floor Model has 40 $\frac{1}{8}$ " maximum chuck to table distance, 40 $\frac{1}{8}$ " table travel, a 15" x 21" slotted base with precision ground top surface, 65 $\frac{1}{2}$ " overall height, 235 lbs. domestic shipping weight. For complete information, write:

South Bend Lathe Works, Dept. BB  
384 E. Madison St.  
South Bend, Ind.

#### NEW SPIRAL-GRIP NON-SLIP COLLETS

The Shell Machine Co. spiral-grip collets have a serrated gripping surface, thus allowing more grip per pound exerted. As a result, they do not track, and exert no directly opposed compression. Spiral-grip collets, under extreme torque, slip from one pyramid contact to the next, raising a minute burr. Due to the thread lead this minute burr ahead of each serration pyramid causes a positive stripped thread freeze, locking the stock in the collet instead of cutting grooves. The serration contacts being blunt, and the thrust direction at right angles to the axis of the bar, the stock cannot follow the thread lead in a



die action. Spiral grips obtain a 100% progressive contact with the thrust surface of the bar stock. Spiral-grip collet have been used on all alloys and types of stock. For further information and bulletin, write:

Shell Machine Co., Dept. BB.  
John R. St., Hazel Park, Mich.



THE ONLY ABRASIVE WITH

DIMINISHING ACTION



For faster precision fitting of gears, valves, cylinders, bushings, and bearings, use Timesaver Lapping Compound. A powdered abrasive prepared especially for applications where fine lapping, perfect control and freedom from imbedment (charging) are imperative.

- Absolutely non-imbedding
- Diminishing (self-reducing) action
- Becomes totally inert thru use
- Laps all metals from soft babbitt to hardened steel
- 29 years of successful use

Write for samples and literature

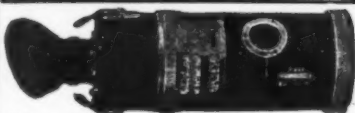
**TIMESAVER PRODUCTS CO.**

739 W. Monroe St.

Chicago 6, Ill.



## PYRO THE SIMPLIFIED OPTICAL PYROMETER



Unique construction enables operators to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.

**THE PYROMETER INSTRUMENT CO.**  
102-105 Lafayette St., New York, N. Y.

## Accurate Hole Transfer Made Easy With NIELSEN TRANSFER SCREWS



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.—Inexpensive—last for years.

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**NIELSEN TOOL & DIE COMPANY**  
1962 W. Eleven Mile Road,  
Berkley, Mich.

*New* **NESTING TYPE TOTE PANS**

20" Long x 12" Wide x 6 1/4" Deep  
16 Ga., drag holes, handles both ends.

**J. L. LUCAS & SON, INC.**  
BRIDGEPORT 5. CONN.

## High Speed Cutting Tools

- special high speed circular, dovetail, flat form and special tool bits.
- Design and manufacture of small machines, jigs, gages and experimental parts.
- Regrinding and salvaging high speed flat form, special bits and small flat broaches.

DELIVERY AS REQUIRED  
WRITE FOR QUOTES

Attractive Proposition for Representatives

**Lincoln Park Manufacturing Co.**  
3302 Dix Road Lincoln Park, Mich.

## BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

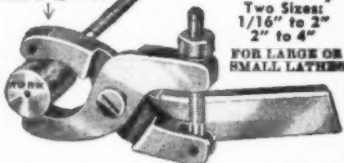
Made in 4 sizes, for hand or motor operation.

Write for Bulletins and prices.

**JOHN T. BURR & SON**  
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Two Sizes:  
1 1/16" to 2"  
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FOR LARGE OR SMALL LATHES

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PROMPT DELIVERY  
UP TO 12" DIAM. - 3 D. P.  
CUTTING ONLY or COMPLETE GEARS  
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Our ROWBOTTOM cam cutting facilities are at your disposal for your cam requirements.

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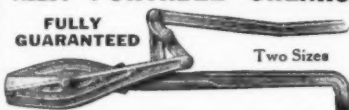
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No. 1 cuts up to No. 11 gauge strip or sheet.

No. 2 cuts up to 1/4" steel plate.

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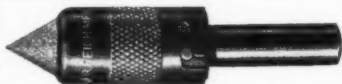
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3 SIZES - 4 MODELS - 6" to 12"

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Saves time, eliminates diamond dressing. Cones changed in seconds. Available in 2 sizes 3/8" and 1/2" Cent-R-Laps and abrasive Cones.

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**SURFACE PLATE** for laying out, surfacing, checking flat surfaces, etc. Precision ground top, 12" x 17" x 3", top 3/4" thick. Price...\$37.50  
**V-BLOCKS** for holding cylindrical parts. Hardened steel. All surfaces precision ground. Size 1-15/16" x 2-15/16" x 2-3/4". Capacity 1/4" to 2". Price per matched pair...\$32.00  
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A.S.A. STANDARD  
Immediate Delivery  
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For "A" section V-belts—3.3—1 speed range—perfect belt alignment in all positions. Priced so low that no shop or machine need go without infinite speed selection. See your dealer or write

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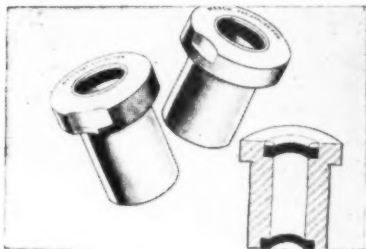
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• 3 sizes from \$44.00 to \$105.00  
Boring capacity  $\frac{3}{8}$ " to 15". Avail-  
able with any standard shank.  
Immediate delivery from stock. Cir-  
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220 BROADWAY • BEDFORD, OHIO

**MEYCO CARBIDE-INSERTED DRILL  
JIG BUSHING**

After a year of engineering and testing this new line of bushings, the W. F. Meyers Co. announces a standard line of Meyco Carbide-Inserted Drill Jig Bushings.



The cut-away drawing indicates the advantages attributed to this new bushing. A tungsten carbide insert at the two points of wear insures long life and accuracy for a longer period of time. This means less non-productive machine time

**SPRING-AIR PRESS**

A compressed air operated press to replace the Kick press featuring

- Adjustable Blow 0 to 5,000 lbs.
- Controllable Speed Push Stroke 500 lbs.
- Two Handed Safety Release
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National Distributors

and man-hours; less waste due to spoilage of parts; less inspection time and greatly increased drill and reamer life, because of a lesser tendency of the bushing to "bell" at the bottom.

The hardened steel ring inserted above the top carbide ring protects both the carbide and the drill against shock of impact, thus retaining the desirability of a hardened steel bushing with all the advantages of tungsten carbide at the points of wear. Meyco bushings are made of special alloy steel, hardened, and will withstand rough usage.

According to the manufacturer, "actual field tests have shown that this carbide-inserted drill jig bushing will outlast by a substantial period of time bushings made of cast alloy, high speed steel or standard carbon steel." Descriptive literature and price lists are offered upon inquiry to:

**W. F. Meyers Co., Dept. BB**  
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Henry Disston & Sons, Inc., Philadelphia 35, Pa., announce the promotion of **J. F. Wilkinson** to the position of manager of industrial sales, replacing **George A. Slacke**, who retired December 31, after 26 years' service with Disston.

**WHITNEY-JENSEN PRODUCTS**  
30 YEARS EXPERIENCE

## 36" FOOT SHEAR

18 GA.  
CAPACITY

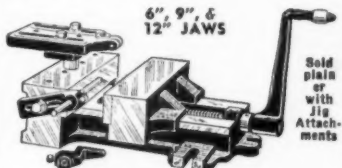


Built-in light fixture illuminates cutting edges of knives — making it easy for you to cut accurately to a scribed line. Write for catalog 16-48.

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115 FORBES ST. • ROCKFORD, ILL.

## BASIC UNIT

for holding plain or irregular pieces for repeat-operation work



Sold plain or with jig attachments

## GRAHAM Multi-Purpose Vise

This flush, parallel, square-finished vise comes with all sorts of jaws, stops, guides, etc., making it a ready-made jig or fixture. Sizes up to 124 lbs. for drill press, radial, planer, shaper, miller, grinder. **ASK ABOUT OUR KNURL HOLDER FITTING LATHE TURRET.**

With a set of these vises (3 sizes) in your toolroom, you are equipped to handle many, many jobs without the special jigs or fixtures that would otherwise have to be made.

## "Adjust-angle" KNURL HOLDER



Fitting  
lathe  
turret

Requires only straight knurls to cut many different patterns on work up to 2½" diameter.

Request  
Illustrated Price  
Bulletin 41



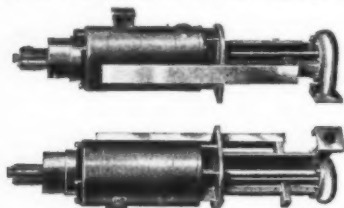
## GRAHAM MFG. CO.

57 Bridge Street • Providence, R. I.

## RUTHMAN PUMPS ADD TO SAFETY IN HANDLING MOLTEN METAL

A recent development in the handling of molten metal which is claimed to accelerate handling, reduce employee hazards and save production time, is the Gusher Molten Metal Pump, a product of the Ruthman Machinery Co.

The new pump enables the operator to handle molten metal with the simplicity of turning on a faucet. The pump



will service lead, solder, zinc, babbitt metal and other alloys at temperatures as high as 875° F. Gusher Pumps have demonstrated their capacity to deliver 1500 pounds of metal per minute as high as six feet above the pot level of hot

metal. They have been designed for long and safe use at the recommended temperatures.

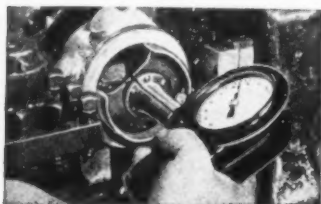
The motor is of the ball bearing type, and drives the pump with an extra heavy one-piece steel (stainless steel, optional) shaft. The rotating assembly is balanced to assure a minimum of vibration. The metal flow is fully controlled at the point of delivery from zero to full capacity, providing a ready and constant supply of metal. Ruthman Pumps are equipped with lugs or guide bars to facilitate lifting them out of the metal when not in use; while in operation, they may be immersed in from four to eight inches of molten metal.

Specifications and dimension prints will be furnished upon request to:

Ruthman Machinery Co., Dept. BB  
1816 Reading Road  
Cincinnati 2, Ohio.

## MERRION COLLET CHUCK FIXTURE

On page 262 of the January issue of the **MACHINE AND TOOL BLUE BOOK**, a new Collett Chuck Fixture received editorial mention; the complete address of this firm is: Merrion Tool Engineering Co., Post Office Box No. 46B, Berwyn, Ill.



Comtorplug in use on turret lathe.

Modern machine tools have NOT outrun ALL shop gages! Although solid plugs are inadequate, the patented expanding, internal gage known as "Comtorplug" puts positive, precise gaging in the hands of your machine operators and bench inspectors. Made in sizes to gage holes from  $\frac{1}{16}$ " to 8" dia. Shows exact size (not a passing reading), detects out-of-round, front or back taper, bell mouth, etc., to fractions of .0001". Automatic accuracy, free of human variations. Gages without removing work from chuck. In use at machines in hundreds of plants—"shop ruggedness with laboratory accuracy." Your new machines can produce the top accuracy of which they are capable, only if your operators have gaging precision comparable to the machine's precision. "Comtorplug" is the answer—see it and you'll see why.

Here's **HOLE GAGING** that matches  
the new machines in speed, accuracy

## COMTORPLUG

used for bench inspection and AT or IN  
the machine

Gages holes  $\frac{1}{16}$ " to 8" dia. to fractions of .0001"

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EXPANDING  
INTERNAL  
COM-  
PARATOR



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External Comparator  
Bulletin 36

COMTOR SURFACE SMOOTH-  
NESS COMPARATOR:  
Bulletin 32A

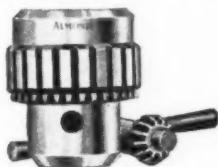
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Waltham, Mass.

## ALMOND DRILL CHUCKS



Maximum gripping power with extreme accuracy and long life.

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**ASHBURNHAM, MASS.**  
**U. S. A.**

## ROLL FORMING MACHINES AND ROLLER DIES



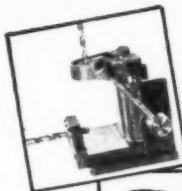
Also Pittsburgh Lock Machines, Pipe and Elbow, Beading, Turning Machines and all other Sheet Metal Working Machinery—

Your inquiries invited.

**Maplewood Machinery Co.**  
2634 Fullerton Ave. Chicago, Illinois

**LIFT-SWING**  
PATENTED

## Fixtures for DRILLING TAPPING - COUNTERBORING INSPECTION - at one setting



Lift-Swing in closed position.

Lift-Swing open—note absence of projections over work.



Amazing savings made by users of the Lift-Swing Fixtures shown here because Bushing Plates LIFT and SWING aside for inspection of work or additional machining operations — **AT ONE SETTING**. Die Set accuracy is maintained because hardened and ground bushings in plate slide on stationary guide and pilot pins. Right angle bearing faces permit drilling in two planes — cam lock release handle permits **FAST OPERATION**.

### TOP PLATES INTERCHANGEABLE

Bushings and pins always locate bushing plates in exactly the same position — a single base can be used for several jobs.

11 standard sizes with clearance between base and bushing plate from  $2\frac{1}{4}$ " to 7". Base sizes from  $2\frac{1}{4}$ " x  $4\frac{1}{4}$ " to 4" x 8".

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57 Perry St., Belleville 9, N. J. 1368

**SEND FOR NAME OF NEAREST SUPPLY HOUSE**

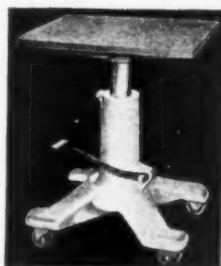
**DIAMONDS**  
FOR WHEEL DRESSING TOOLS

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**DIAMONDS**  
FOR ALL INDUSTRIAL PURPOSES

**KOEBEL**

KOEBEL DIAMOND TOOL CO.  
9456 Grinnell Avenue, Detroit 13



## SAVE Labor and Time

Eliminate heavy lifting. Cut handling costs. Table swivels and locks in any position. Can be varied 15½" by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

Send **TODAY** for illustrated catalog No. 2.

**MIDWEST TOOL & ENG. CO.**  
112 Webster St., Dayton, Ohio

*"Production"*  
**Type S**  
— CENTERLESS —  
SURFACER  
POLISHER  
BUFFER



Cut production costs with this versatile machine which combines a centerless feed polishing machine with a vertical or horizontal belt surfacer, polisher or buffer.

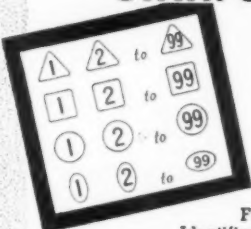
Ideal for cylindrical polishing or straight line finishing on flat work.

Outstanding features—Quick Change from vertical to horizontal—Adjustable Gauge for bevels—Tracking Device for quickly tracking belt and Automatic Take-Up for stretch of belt.

Write today for information.

**PRODUCTION MACHINE CO.**  
GREENFIELD, MASS.

**New STEEL**  
**INSPECTOR'S STAMPS**



Faster Identification of Inspectors or Operators. Different borders may be used for different shifts. Available in 4 sizes. Write for prices today.

**NEW METHOD STEEL STAMPS, Inc.**  
187 106 CAMPAU - DETROIT 2, U. S. A.







# Adjustable MULTI-DRILL for Production Drilling

9" DRILLING AREA  
AVAILABLE WITH 2 TO 8 SPINDLES

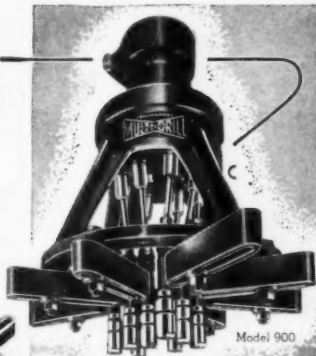
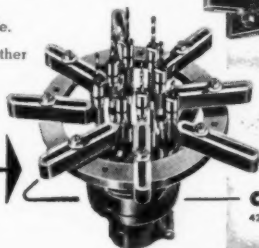
- Designed for accurate, high speed production drilling
- RUGGED CONSTRUCTION
- Quick, easy adjustments to **any** hole pattern on or within a 9" circle;  $\frac{1}{8}$ " minimum center distances; Drill sizes  $\frac{1}{16}$ " to  $\frac{3}{8}$ "
- Special adaptations available.

MULTI-DRILLS are made in other sizes and models.

Write for details and name of your nearest Distributor.

Locator arms are designed for fast, easy adjustment

Dependable Performance...  
proven by industry



Model 900

**FITS ANY  
DRILL PRESS**

**COMMANDER MFG. CO.**  
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## GRANT RIVETERS



have  
SPEED  
and



## STAMINA

These GRANT Riveters are available in Noiseless Spinning and Vibrating Hammer types. Also Vertical and Horizontal Multiple Spindle Spinning Machines.

Information? Write!

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C E Station, Bridgeport 5, Conn.

## TOOL ROOM OPTICS

TROUBLE SEEING  
YOUR LAYOUTS?  
DIFFICULTY CENTERING  
THEM ACCURATELY?

*You Need*  
**OPTI-LOCATOR!**



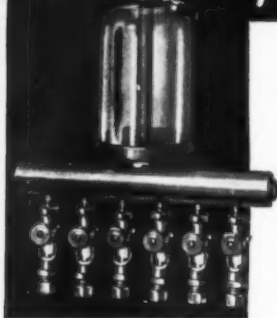
- Functions on any machine with cross-feed.
- Split - thousandth accuracy in 60 seconds.
- Convenient to use... cheap to buy.

*Write to*

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Dept. H 351 S. LABREA, LOS ANGELES, CALIF.

# MULTIPLE LUBRICATION

## *Simplified*



Here you have only one receptacle to watch and keep filled—a time saver and an assurance of dependable lubrication. Gits "MD" Sight Gravity Feed Multiple Oiler is a simple, practical and economical means of lubricating from 3 to 12 individual points from a central reservoir. Large capacity, transparent unbreakable plastic reservoir provides clear vision of oil contents at all times. A shut-off valve is located at the

top of the transparent reservoir to prevent oil flow to the horizontal oil chamber when machines are not operating. Each drip fitting is equipped with an individual needle valve adjustment for regulating flow of oil, which can be locked against vibration. Ask for complete information on range of models and prices. Gits Catalog No. 60 illustrates and describes a full line of Oilers, Oil and Grease Seals and Lubricating Devices—write for your copy.

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*Exclusive for over 40 years*

### **ALLIS-CHALMERS COMPLETES CENTURY OF BUSINESS**

Coinciding with a renowned period of U. S. industrial development, Allis-Chalmers Mfg. Co., Milwaukee, Wis., in 1947 completed a century of engineering and manufacturing that has produced an organization formed from 16 separate firms supplying more than 1600 different products to industries all over the world.

In 1847, Charles Decker and James Smith, two Ohioans, founded the organization as a finisher of French burr mill stones for flour mills in and around Mil-

waukee. Credit for expansion into power generation power distribution and power utilization equipment may be attributed to Edward P. Allis, who, with two other men, in 1861 acquired the company. Allis is also responsible for establishing the present company policy of diverse manufacture.

Throughout its history, many firsts and world records have been credited to Allis-Chalmers and its engineers. An important contribution to the power field was the installation of its first steam turbine in 1906. This was so successful that Allis-Chalmers advertised it and in 1907 they had sold or had orders for 55.

In 1914, the company produced its first tractor, and its pioneering in farm machinery has made the name familiar to millions. In 1924, they introduced the Textrope V-belt drive, application of V-belts in multiple being originated by Walter Geist, later

president of the company. This marked the beginning of individually-powered machines.

Today, its employees are helping to meet new needs of industry and agriculture in an atomic age with the production of such equipment as a power unit designed to use powdered coal as fuel and develop 3,750 hp for the world's first gas turbine locomotive; a 22,000,000-volt betatron which can "look" through 20 inches of steel to find hidden flaws; and the first solvent extraction plant for vegetable oils.



**"TAILOR" THE SPEED TO FIT THE JOB  
WITH THE TAYLOR MADE  
VARIABLE SPEED DRILLING MACHINE**

- The exact speed required for drill diameter and material at the turn of a knob.
- Exact control of speeds means less breakage, fewer grinds, higher efficiency.

**TWO MODELS — 1-6 spindles**  
**M-125  $\frac{3}{8}$  Cap. (illustrated)**  
**M-96  $\frac{7}{8}$  Cap.**

WRITE FOR BULLETIN DE-  
SCRIBING BOTH MACHINES



**THE TAYLOR & FENN CO. HARTFORD 1, CONN.**

## **LAPPING and GRINDING COMPOUNDS**

**GRADE 17 (Medium) GRADE 18 (Medium Fine) GRADE 19 (Fine)**

**SPECIAL COMPOUNDS FOR BRASS AND BRONZE**

### **PLUG COCK VALVES**

These three grades of compounds have a special water soluble base that possesses excellent lubricating qualities for grinding various styles of plug and key cock valves. These compounds do not "niggard or score" while grinding—a common trouble with most compounds. They contain abrasives of the proper grit size for grinding or lapping-in brass and bronze plug valves. The finished parts can be washed with ordinary water.

*Generous samples sent upon request*

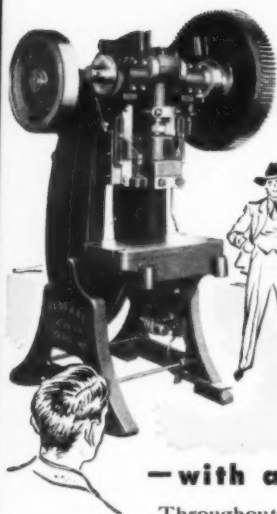


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courtesy Hays Mfg. Co.

**UNITED STATES PRODUCTS CO.**

**518 MELWOOD ST.**

**PITTSBURGH, PA.**



## A WHALE OF A PRESS

—with a host of friends!

Throughout the metal-working industry you'll find Federal Presses boosting production, cutting costs, eliminating accidents, performing a wide variety of jobs... and making new friends every day. Today more Federals than ever before are speeding products to hungry markets. They may help to solve your production problems. Write today for latest catalog of complete Federal line.

The Federal Press Co., 448 Div. St., Elkhart, Ind. — Tel. 2831

FEDERAL



PRESSES

### FORD CO. ACHIEVEMENTS CREDITED TO EMPLOYE TEAMWORK

Ernest R. Breech, executive vice-president of the Ford Motor Co., Dearborn, Mich., recently credited the teamwork of Ford employees with the more than a million vehicles coming off assembly lines and outlined briefly the Ford picture for 1948.

"Despite many difficulties and shortages in both production and supply," Mr. Breech said, "we have come through the year with some sound accomplishments."

our facilities expansion and improvement programs at the rate of approximately \$100,000,000 a year," Mr. Breech stated.

Ford truck assembly lines closed in November for model changeover, new models to be announced in mid-January. Lincoln and Mercury will present their new cars a few months later and new Fords will follow. More than \$80,000,000 was spent in tooling for the three lines, and a job that normally requires several years was accomplished in 18 months.

Mr. Breech stated that Ford is pleased with 1947 accomplishments.

Steel, according to Mr. Breech, would continue to be the limiting factor in 1948. There were some strikes in major suppliers' plants, but for the most part assembly lines continued to operate. Many improvements were made in the Rouge plant in 1947 and the company also opened several new parts depots throughout the country.

The manufacturing division acquired two new plants, one a forging unit at Canton, Ohio, and the other a machining operation in the Detroit area. Construction was started late in the year on one wing of the dynamometer building, the initial step in the projected research center program at Dearborn. In October, ground was broken for construction of a new 1,400-ton capacity blast furnace, and a second - hand rolling mill was acquired for finishing operations.

"We expect to go right ahead with

# CUT POLISHING COSTS

**and speed up production!**

This Schauer Speed Lathe, with vacuum-type holding fixture, polishes steel, copper, or aluminum bowls, discs, and other circular metal shapes, (thin or thick), **faster**, and with more uniform lustre . . . and without marring or distorting the polished object!

Vacuum holding fixtures are designed to meet individual requirements. For complete description of this and other cost-saving Schauer Speed Lathes —

Write for Catalog 440

**THE SCHAUER MACHINE CO.**

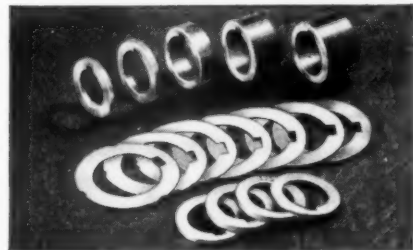
2064 Reading Rd. Cincinnati 2, Ohio

Schauer Speed Lathe  
**ROTATES THE PART,**  
resulting in faster, more  
uniform polishing.



## PACKAGED PRECISION

MACHINISTS HAVE LEARNED TO RELY ON DE-STA-CO Arbor Spacers and Shims for milling, slitting, gang-saw set-ups and for shimmming gears and bearings. De-Sta-Co long-life steel Spacers are packaged in a standard range of sizes from  $\frac{3}{8}$ " to 4" hole diameter, up to  $5\frac{1}{2}$ " outside, thicknesses from .001" to .125", all *with keyway*. Shims are stamped and coined to commercial tolerances in the same preferred sizes, *without keyway*.



Special spacers—thicknesses greater than .125"—are also available in popular sizes, machined from bar stock, hardened and ground, with standard keyways and thickness identifications.

Handy spacer kits of 19 graduated decimal thicknesses are stocked by Mill Supply Dealers in principal industrial centers. Order your *Packaged Precision* Today.

Your De-Sta-Co Toggle Clamp Catalog No. 47 is waiting for you. *Send for it!*

**DETROIT STAMPING COMPANY**

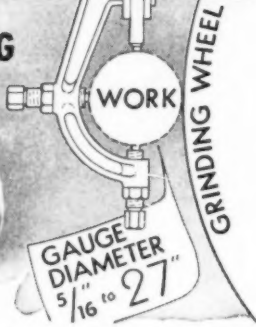
347 Midland Ave.

Detroit 3, Mich.

# Speed Up GRINDING JOBS

With Automatic  
DIAMETER INSPECTING  
GAUGE

VISUAL  
READING  
DURING  
GRINDING



Pratt Grinding Gauges caliper external cylindrical jobs while work is in motion or at rest. Adapted to straight or tapered work. Tolerances of .0001" plus or minus easily maintained. Visible check on out of roundness, rough grinding and chatter. Cannot grind work undersize unknowingly. Easily installed on any grinder. Pratt Grinding Gauges increase production, eliminate scrap and assure accuracy. A modern precision tool, ruggedly built.

## American

**DIAMOND TOOL & GAUGE CO.**

15920 WOODINGHAM • DETROIT 21, MICH.

Send for Bulletin

### RAILROAD RAIL OF FUTURE TO HAVE NEW SHAPE SAYS RESEARCH TECHNICIAN AT ASME MEETING

Most of the railroad rails of the future will have a new shape. This prediction and the story of the improved rail design based on investigation and study following a rail failure in 1940, were presented at a metals engineering session of the fall meeting of The American Society of Mechanical Engineers (29 W. 39th St., N. Y. 18) by Walter Leaf, research technician of the Denver and Rio Grande Western Railroad.

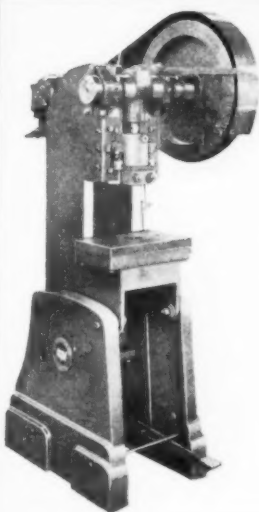
Mr. Leaf stated that preparatory work

on a new rail design followed the cracking and rupturing of a 112 pound rail on the main line of the Denver and Rio Grande Western Railroad. The three new rail sections, approved by the Rail Committee of the American Railway Engineering Association and adopted as standard design after several years of experiment, are very similar to the design worked out by the Denver and Rio Grande Western Railroad which is, in effect, the old web turned upside down and thickened throughout, Mr. Leaf explained.

In the first changes in rail design tested by the company, the web was merely thickened by running straight lines between top and bottom but further changes proved to be necessary, Mr. Leaf explained. Since web stress is usually highest in the upper portion, the lower portion need not be as thick as the upper.

This principle was followed in the new design, which is in effect an inversion and slight thickening of the original shape. In redesigning the web, new contours had to be coordinated with the other factors in rail design.

The A.R.E.A. research staff began work on the problem at the request of officials of the Denver and Rio Grande Western Railroad, and the rail which they designed had the salient features indicated by that railroad's photoelastic work. The railroad bought and installed the first rolling of the new 114 pound section in 1946 and now has about 20 miles in track.



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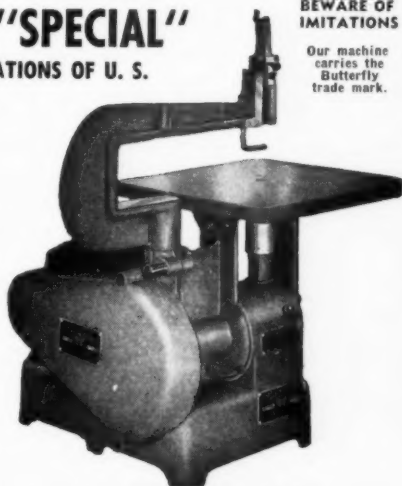
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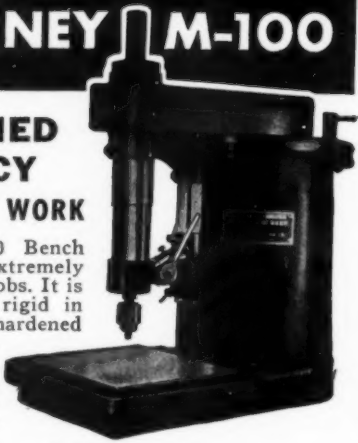
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### 1947 ANTI-FRICTION BEARING SALES TOP 1946 BY 25%

Unprecedented demand for consumer goods and industrial equipment in 1947, increased the sales of ball and roller bearings to approximately \$275,000,000, a 25 per cent increase over 1946, it was reported here today by George Carleton, president of the Anti-Friction Bearing Mfrs. Assoc., 1 East 43rd St., N. Y. 17, N. Y.

Both employment and sales for the anti-friction bearing industry were at an all-time high for any peacetime year.

Sales volumes for the past 12 months represented a 275 per cent increase over the last peacetime peak in 1937 while the total number of workers engaged in the manufacture of ball and roller bearing reached 50,000.

The nation's steel shortage will have a decisive effect on bearing production for the coming year with the most critical period expected in the first quarter of 1948. At the present time, delivery schedules on standard ball and roller bearings range from 60 to 90 days except in the case of special assemblies and bearings made from strip steel where delays may be longer. In some cases, it was pointed out, companies have been able for the first time since 1940 to build up an inventory of

standard ball and roller bearings, so that orders can be met out of stock.

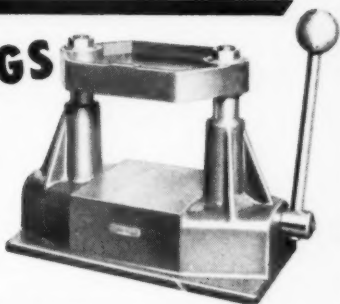
Although there are now 18,000 different sizes and types of ball and roller bearings produced, the joint engineering committees of the industry are currently working toward greater standardization and simplification. During the year, the industry adopted a standard numbering system which makes identification and ordering easier and more efficient. The joint committees are also studying means to reduce the total number of bearing types.



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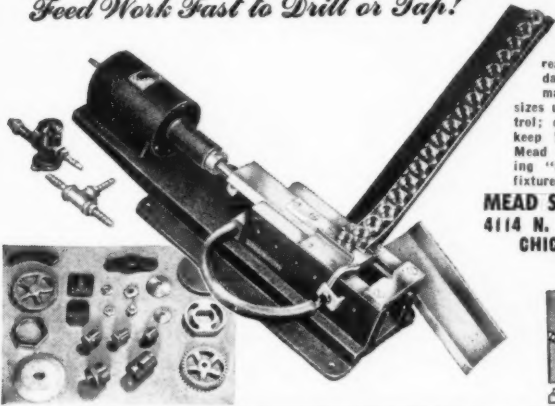
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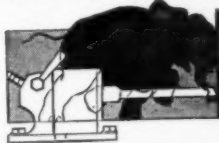
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## KENT-OWENS *Milling Machines*

### RESPECT FOR COMPETITION IS KEY TO DU PONT SUCCESS

An important element in the success of the Du Pont Co., Wilmington 98, Del., is the fact that it constantly maintains a healthy respect for the business ability of its competitors. Luther D. Reed, director of its Trade Analysis Division, said in an address recently.

Speaking before the American Society of Mechanical Engineers, Mr. Reed explained ways in which business concerns—large or small—can keep informed about the markets for their products.

"One of the outstanding requirements

in any organization," he said, "is to know where it stands in comparison with its competitors in a given field of distribution."

Competitive studies should be arranged for the management showing them what percentage of the market they have and also what percentage goes to their competition, in detail and by name. Mr. Reed cited a study of competition he once made in one of the ten Du Pont production departments. This department sold a number of manufactured products, operating in various fields of competition. It was found they had no less than 52 different competitors.

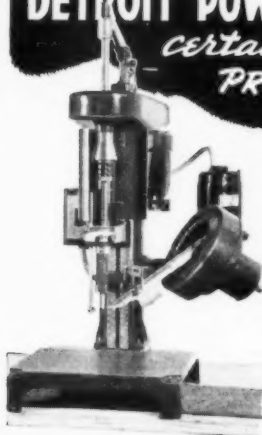
"This certainly is evidence that competition is a governing factor in any business no matter how small or big. The greater your success, the greater effort is made by others to share it. Success

comes about by attention to detail and at all times knowing your position on the sea of commerce." Mr. Reed said that engineers, with their "analytical, planning and structural type of mind, may find a new opportunity" to contribute to the improvement of sales engineering. Fundamental principles of conducting a business are the same for a peanut stand or a million dollar industry.

"There is," he said, "an engineering job to do which must establish the same type of scientific management within the art of selling which we today placidly accept within the sphere of production."

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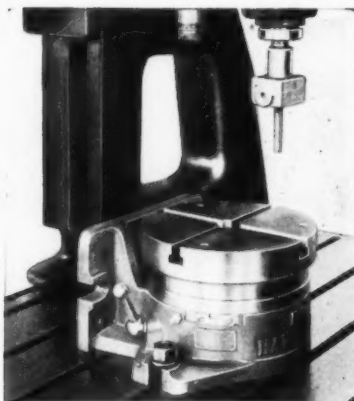


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#### KOPPERS COMPANY REVIEWS 1947 ACHIEVEMENTS

1947 was a good year for Koppers Co., Inc., Pittsburgh 19, Pa., the Company stated in a review of the activities of last year.

In a statement accompanying the review, General Brehon Somervell, president, said that Koppers will continue to devote a large amount of research effort to the development and improvement of chemical products. New facilities for producing polystyrene, an important plastic, are under construction

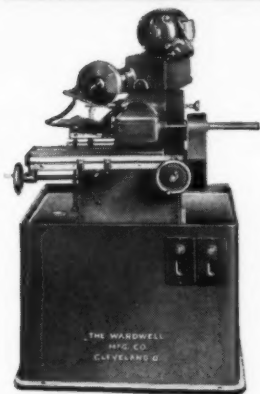
at Kobuta, Pa., and are to be put into operation the first half of 1948. Research will also be devoted to making synthetic liquid fuels and other chemicals from coal.

Highlights of the Company's 1947 operations included: Coke plants and auxiliary equipment were erected at a record rate, matching activity of most of the war years. The Tar Products Division found ready markets for all materials it could produce in 1947, but was handicapped to some extent by shortages in oil which caused some of its suppliers to burn the tar which normally would be sold to the division.

In the Gas and Coke Division operations were at capacity during 1947. The Wood Preserving Division, which operates 21 plants throughout the country, treated 13 percent more wood in 1947 than during 1946. The division sells products chiefly to rail-

roads, utilities, and highway departments.

The Piston Ring Division suffered from an overstocking of rings by automotive parts jobbers and dealers in 1946. As a result of the large inventories in the hands of the trade, Koppers factory sales were reduced. Industrial piston ring business held up well, however, and the division made progress in automotive development work. Koppers Porous Chrome Piston Rings were accepted as standard equipment by four manufacturers of trucks. The Company also developed a new high test iron ring.



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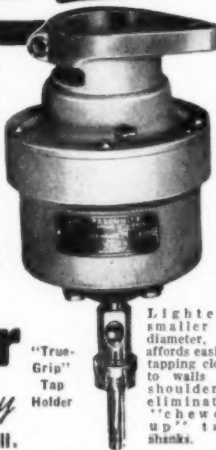
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## LINCOLN ELECTRIC PAYS \$3,800,000 BONUS FOR 1947

James F. Lincoln distributed \$3,800,000 to 1155 of his fellow workers as their share of the net results of the operation of The Lincoln Electric Co., Cleveland 1, Ohio, for 1947. Checks ranged from \$25 for short time employees to \$35,000 for top managerial and engineering talent.

In distributing these checks Lincoln declared, "If all companies would adopt a plan similar to the one under which we operate, rising prices would be

drives prices to inflationary heights is eliminated. The goods are there to be had and the people have the money to pay for them without resorting to installment buying."

Lincoln explained that the bonus, which has been paid every year since 1933, does not result from any slick system for getting long profits. The teamwork and effort of the organization created a production rate in terms of shipments of over \$28,000 per man per year, claimed to be about 4 times greater than in most large electrical manufacturing companies.

halted and the threat of runaway inflation would be eliminated. There would not be any possibility of a need for government price controls. The housewife would once again be able to market without facing higher prices every week.

"Because of our system of recognizing performance and of keying performance to low cost production, our organization has produced more, the people have earned more and the customers have received a better product at a lower cost. The number of people on our payroll has increased, while our prices, since 1933, have been reduced 50%.

"When men are paid," Lincoln added, "for what they produce and not merely for the amount of time they put in, such as the men and women in our organization are paid, the supply of goods is kept in balance with the demand for goods. The pressure that

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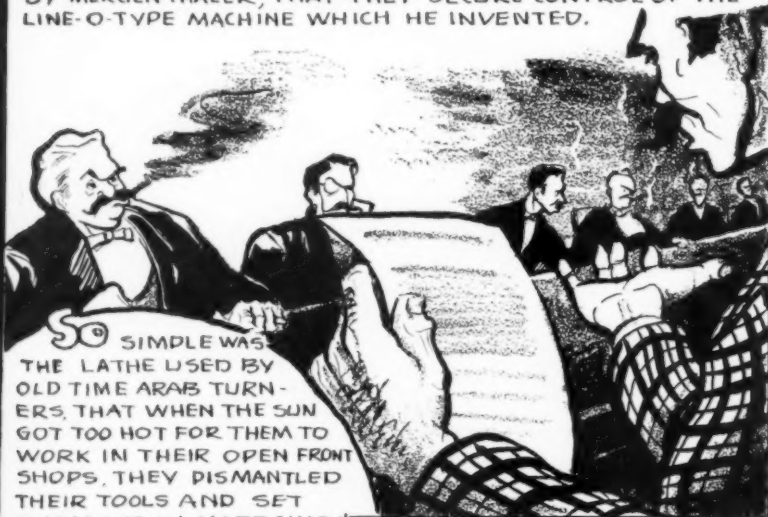
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15/64	3.96	O	6.62		15	3.08	46	1.59
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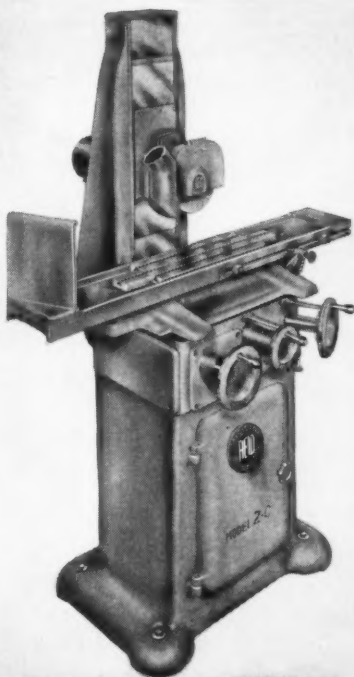
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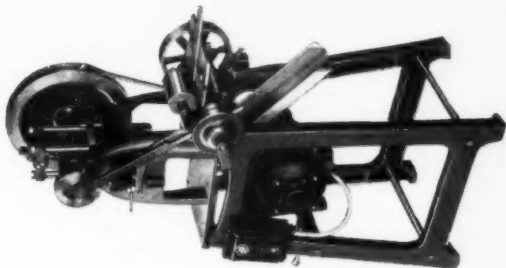
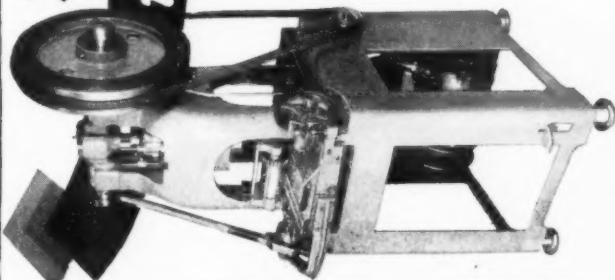
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11/64"	12	9	1.50	3/8"	12	9	2.50
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13/64"	12	9	1.60	13/32"	12	9	2.75
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"	F-2	7/16"	3/16"	2 3/4"
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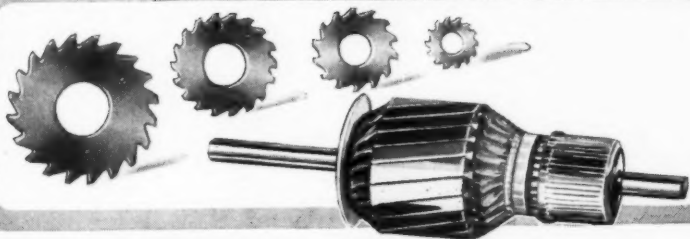
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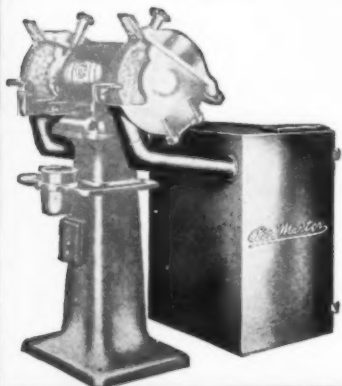
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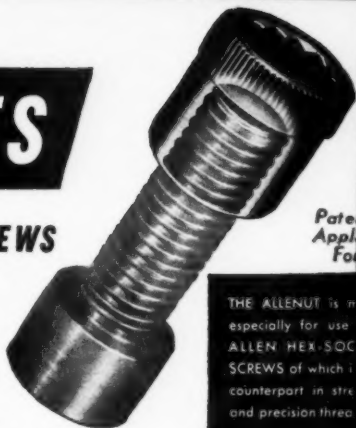
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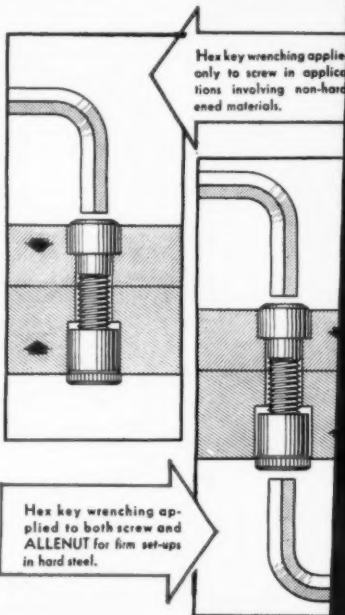
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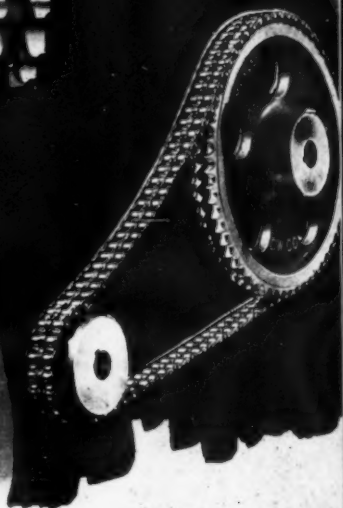
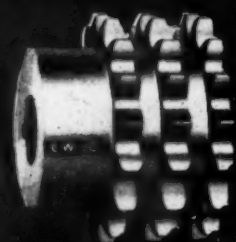


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